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204 Sturm
Reflections on the
works of God.

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REFERENCE

Frank D. Daggett

Pasadena Calif

July 17/95.

REFLECTIONS

ON THE

Works of God

IN

NATURE AND PROVIDENCE,

FOR EVERY DAY IN THE YEAR.



BY CHRISTOPHER CHRISTIAN STURM.



TRANSLATED BY

ADAM CLARKE, LL. D. F. A. S.



FROM A LATE LONDON REVISED AND CORRECTED EDITION.

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THE

AUTHOR'S PREFACE

TO

THE THIRD GERMAN EDITION.



MORE than a hundred years have elapsed since the pious SCRIVER published a work entitled, *Occasional Meditations on the Works of Nature and Art*. I make no scruple to declare, that I value this work highly, and prefer it to a multitude of modern books of devotion, which are equally destitute of taste and accuracy. It is true, that in some respects, the form and style of Scriver's work are unsuitable to the refined taste of the present age; yet it has a number of advantages, well calculated to compensate the reader for any faults he may find in it. The author's zeal for practical religion, his manly sense, his comprehensive knowledge of the works of nature and art, and the pains he took to adapt his language to the apprehension of illiterate people, are advantages which are rarely found in any book of devotion, either of the past or present century.

It was the esteem I always had for Scriver's work which first inspired me with the desire to compose one similar to it. I had a twofold design in writing *Meditations on the Works of God in the Kingdom of Nature and Providence*: 1. That those who had little time for study, might find a treatise, pointing out whatever was most essential to be known, relative to the objects which God daily presents to us in the widely extended empire of nature.

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Dup. Ex.

For this purpose, I have chosen out of the vast mass of natural history, the objects which daily surround us, the historical knowledge of which requires no extraordinary depth of capacity. I have endeavoured so to express myself, and to represent my subjects in such a manner as should at once render my work intelligible and interesting to all orders of Christians, the most enlightened not excepted. In endeavouring to accomplish this end, I proposed a *second*, viz: To show the reader how he may derive lessons of wisdom and virtue from the contemplation of natural things.*

In order successfully to accomplish these designs, I found it necessary to avail myself of all helps which the works of naturalists could afford me; I have, therefore, made no scruple to borrow from Buffon, Derham, Pluche, Niewentyt, Sulzer, Bonnet, and other writers of this class, whatever was expressed with most precision and energy, and whatever was best calculated to give my readers the most correct ideas on the subject. I feel a pleasure in embracing this opportunity to acknowledge the assistance I have received from the rector, Mr. Lorenz, who not only composed some of the Meditations, but whose extensive knowledge in natural history has enabled him to furnish me with information, which I have endeavoured to detail for the edification of my readers.

In this new edition I have made many corrections and improvements, which I hope will give it a new advantage over that spurious work which has been published in three different places, by certain rapacious booksellers.

I would gladly have availed myself of the improvements which the *Swedish* translator has made in my work, had I sufficient knowledge of that language.

STURM.

HAMBURG,
July 24, 1784.

* In the advertisement to the first German edition, the author explains the motives which induced him to give his work the form of Meditations for every day in the year;—The motives were, 1. To provide a sufficient variety. And, 2. That the reader might be led to sanctify each day by contemplating the works of God.

Note.—In the preface to the second German edition, the author says, “I have made no considerable alteration in this new edition; I have only retrenched the *hymns* which are found in the first edition, and substituted pieces written in prose. This plan appeared to me the most proper, especially as I had lately published a *Collection of Hymns on the Works of God in the Empire of Nature*.”*

* In order to unite the advantages of both editions, not only the substituted pieces are carefully translated in this, but the hymns also which were in the first, are here given in prose. The poetic pieces in the last German edition, printed at *Halle*, 1785, are also translated into prose, and distinguished at the end of each meditation, or wherever else they occur, by *inverted commas*.

THE TRANSLATOR'S PREFACE.



THESE REFLECTIONS have been presented *twice* already to the public in an English dress, by different hands. One of these publications professes to be only what it is,—*An Abridgement*, in one volume, 12mo. containing about one half of the original work. The other, in three volumes, professes to be the whole work, yet omits *seventeen* whole pieces, which were in the first German edition, and in the French translation, from which these volumes were taken. But, besides this, it omits a *part* in most of the Meditations, and in some cases a *third* of each. To the truly Christian reader, these omissions will appear of serious consequence, when he is informed that they contain those parts which chiefly relate to *experimental religion*. Besides the above, there are other papers left out, and something of the translator's collecting substituted: and all this is done without ever mentioning the unwarrantable liberty thus taken.

A desire that the *whole* work of the pious author should appear, from a conviction that it was well calculated to diffuse useful knowledge among the people at large, induced the translator to undertake the task of giving a new version to the public. Judging that the stream must be purest at the fountain head, he endeavoured to procure, but in vain, the *first* German edition, as in that only the hymns are found, which the author having published by themselves, left out in the two subsequent editions. Finding that the French translator had retained those, and perceiving from collating it with the *third* German edition, that it was a very correct and faithful version of the original text, the

present translator had no doubt but the devotional pieces taken from the first German edition, which he could not procure, were as faithfully translated as the rest of the work, he chose it therefore for the foundation of his own; reserving to himself the liberty of collating every Meditation with the text of the third German edition, printed at *Halle*, in 1784.

In the preface to the above edition, it is intimated, that many *improvements* and *additions* have been made in the work: but the reader will find it still sadly defective. As the translator discovered many inaccuracies in the astronomical papers, and in those on natural history, he was in hopes of finding them rectified in this last edition: but he was disappointed.—The planet *Herschel*, or *Georgium Sidus*, is not mentioned, though discovered March 13, 1781. Saturn has still only *five* satellites: the *distances* and *periodical revolutions* of the planets are not corrected according to late and accurate observations.—*Platina* is still ranked among the *imperfect* metals; and the *increased* catalogue of these last, well known to all the German and French chemists, is not once noticed. These were serious defects which the translator thought himself obliged to supply in the best possible manner. Besides the above, many other inaccuracies are corrected, and it is hoped that the work, in consequence, will be considered more worthy the attention and approbation of the public than it has hitherto been.

Fidelity in the translation has been scrupulously studied; and this probably has produced too great a stiffness in some parts: but the translator indulges the hope, that, in general, the style will be found easy and perspicuous; and that the work carries no *extra* load of error or imperfection.

Lest any should be disappointed in reading this work, by expecting more from it than it promises, let the following directions be attended to. 1. None should expect to find here his *peculiar* religious creed:—the translator did not every where meet with his *own*, and yet he was determined to permit the author to address Englishmen in the same way in which he instructed those of his own country. 2. Let none hastily conclude, from reading *one* of the Meditations, that the subject is superficially treated:

because it often happens, that the same subject is resumed in other places, and considered in different points of view. 3. Let it be observed, that the work does not profess to be a *complete system of natural philosophy* : it is only *Reflections on the Works of God*, tending to diffuse useful knowledge, and to assist the spirit of devotion in those who wish to acknowledge God in *all* his ways.

The great and laudable design of the pious author is, to make God known by his works, to hide pride from man, by pointing out the limited state of human knowledge ; and to evince the necessity of a Divine Revelation, and the Saviour it presents to sinners.

Those who are employed in agricultural matters, from the most scientific *farmer* to the meanest *ploughboy*, may derive knowledge in nature, and instruction in righteousness, from this work : a work in which sound philosophy and pure practical piety go hand in hand, and lead the serious reader through the beauteous paths of nature into the paradise of God.

However defective the work may appear in systematic arrangement, yet most subjects of importance, in astronomy and natural history, are here exhibited in plain, yet appropriate language ; so that a person of common capacity may acquire a competent knowledge of the most remarkable productions of the earth, and the most striking phenomena of the heavenly bodies, which are all introduced here, to speak the perfections of their Creator, and to invite men to reverence, love, and obey Him.

The work contains a distinct subject for *every day* in the year ; the subjects themselves being adapted to the particular *seasons* ; by which the reader is brought to a philosophic acquaintance with the various productions of the earth, in the *order* and *time* in which they occur. By this division, the work is excellently adapted to the use of families and individuals who have but little time for reading or study. On this account, the translator presumes it will be found very profitable to read the Reflections for the day, regularly, with a portion of the Sacred Writings ; this cannot fail greatly to increase useful knowledge, both divine and natural, in every family, where this mode of reading is attended to.

The translator particularly recommends it to all who fear God, and who desire to know and adore his perfections, as represented in the book of Divine Revelation, and demonstrated in the volume of Nature, here unfolded by the pious and masterly hand of this German Divine.

ADAM CLARKE.

ADVERTISEMENT TO THE SECOND EDITION.

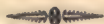


IN a short time after the publication of the first edition of this translation, the whole impression (by no means a small one) was sold off. The increasing demand for the work proved that it had received a large portion of the public approbation : in consequence of which the translator was encouraged to revise and correct the whole, and commit it a second time to the press. With much gratitude to the Fountain of wisdom and goodness, he rejoices in being able to state, that the work has been the means of diffusing correct notions of God and his works through a vast mass of the people, who, previous to their reading it, were comparatively unacquainted with both. Even *ploughmen* and *mechanics* have become *philosophers* ; and the philosophy they learned from Sturm, they have found to be the handmaid of divinity : by both they have been led to give glory to God in the highest, and to endeavour to promote peace and good will among men.

The translator hopes that this new edition will not be less favoured with the Divine blessing : and as it is accurately revised and corrected throughout, he has no doubt but it will still meet with that approbation which was so liberally bestowed on it at its first appearance ; and of which its present improved state renders it still more deserving.

ADAM CLARKE.

TO
DR. CLARKE,
 ON
HIS UNMUTILATED* TRANSLATION
 OF
STURM'S REFLECTIONS.



DEAR CLARKE, believe the poet : not alone
 Let fair Philosophy her starry throne ;
 Her lov'd companion, Poesy, surveys,
 In nature's empire, wisdom's sweet displays :
 Not only joys Philosophy to rove
 The lawn enamell'd and empurpled grove ;
 Nor only rapt, adores the splendid beam,
 That gilds divinely great Redemption's theme :
 From heaven benignant, whence the blessings flow
 That make our weal, or mitigate our wo,
 The Muse descended on ethereal wing,
 With vocal song sublime, and sounding string.
 Young nature, smiling in her virgin charms,
 The heavenly guest received with ready arms ;
 Bade all the beauties of the realm attend
 The beckoning summons of her sky-born friend.
 " Ye plastic forms ! obey the potent lyre,
 " When wills the Muse, in sweetest charms, attire :
 " Gliding obedient, fairest forms ! along,
 " Follow her lyre, and decorate her song ;
 " They lay omnific while her strains rehearse,
 " Be all that wills the omnipotence of verse."

E'er since, obsequious to her high command,
Being awaits her modulating hand ;
 And genial forms when by the Muse array'd,
 Yield lovelier light, or sink in softer shade.
 Alike her movements, whether liquid air,
 Her agile steps, or land, or ocean bear.

* See the Translator's Preface

The world of waters, all its sleepless waves,
 Its finny colonies, its sapphire caves,
 And all the beauties of the spangled sky,
 At once unbosom to the piercing eye.—
 'Tis her's to lift the bold adventurous plume;
 Where aught of finite never dares presume;
 To hear entranced, what mortals cannot hear,
 And catch the music of each tuneful sphere,
 To dazzling suns enthron'd in living light,—
 Where'er their beams impel their distant flight,—
 Where'er, dependant on their frontal fires,
 Hang their gay planets,—there the Muse aspires:
 Pursues the light-wing'd thought through boundless space,
 And gives her song the glowing captive's grace.

And "nature's minims," how the Muse describes,
 With keen, acute, discriminating eyes;
 With disquisition, elegant and free,
 Dives the deep thought where being 'gins to be;
 Sees, in the womb of nature's gloomy mine,
 The embryo crystal first essay to shine:
 The dazzling diamond its first beams acquire,
 And in the centre drink the solar fire,
 Perceives in mother earth's alchymic mould,
 The mellowing clay transforming into gold;
 And infant silver, emulous of white,
 Imbibe with soft desire, the lucid light.

But chief (the poet's lovely theme of themes)
 The Muse beholds the scintillating beams,
 Amid the scenes that mark the varying year,
 Excite the leafy people to appear;
 In hues distinct each family array,
 And paint their sweet cheeks innocently gay.
 From Taurus soon to where the Virgin's charms
 Invite Apollo to celestial arms.
 Day's radiant chief, with unabating speed,
 Along the skies compel the flaming steed:
 Now golden sun-beams in the welkin glow,
 Now hang rich fruits on every yielding bow:
 And waving ears the yellow plain along,
 A phalanx'd army, amicably throng.
 But soon succeeding down th' autumnal vale,
 On cool, dark pinion, sighs November's gale;
 And gray-beard Winter quickly posts behind,
 On rapid wings of cloud embattling wind:
 Up to the heavens exalts his hydra heads;
 His sable mantle o'er the world outspreads:

In frozen fist holds mountains, dales, and plains,
And binds the limpid rills in icy chains.

Him, ALL in ALL, the raptured Muse espies,
In azure vest, who decks the vernal skies ;
Whose skilful hand the summer scene designs,
Paints the bright plains, the sylvan bower entwines ;
Whose ample bounty fruitful Autumn crowns,
And whom old Winter, midst his terrors, owns.
Admires the temple ; better pleas'd to admire
Th' essential Deity,—her God, her Sire.
Still nobler ecstasies the Muse inflame,
Amid the themes that speak the Maker's name ;
And higher pleasures occupy her breast,
When seen in all the *God of grace* confest.

Thus taught in Luther's school,* (hail, name approv'd !
Priz'd by religion, and by learning lov'd !)
Wisdom and grace, philosophy explores ;
The *Maker* loves, the saving God adores !
A second Luther's *pupil* bids again,
Thee, hallowed Virgin, burst thy British chain ;
Bids thee, indignant, cast the vail away,
Whose shade unholy hid thy loveliest ray.
Clarke bids thy brilliant sceptre re-assert
Thy gracious empire in the *Christian* heart ;
With purest beams diffusive and divine,
In all thy *evangelic* glories shine.
At Clarke's command thy beauties re-appear,
Wipe, lovely captive ! wipe the last sad tear,
And, while his hands thy pristine charms restore,
Be all that STURM depicted thee before.

THOMAS ROBERTS.

* M. Sturm was a *Lutheran* minister.

LINES

ON

READING STURM'S REFLECTIONS.



I SING the Source of being, nature's Lord!
In all his works eternally ador'd!
His works are great, and still his power proclaim;
Sought out, and known of those that love his name:
Who pleas'd, trace down his wonder-working power,
From the bright sun to its obsequious flower:
And what of *great* or *small*, that stands between,
In *all*, his skill and forming hand are seen.

But *chief* of all his works, since time began,
He summon'd into life, and nam'd it Man:
A wondrous frame! Of dust he made the whole,
And breath'd into the clay a living soul;
With intellect endued, and powers of sense,
To scan the wonders of Omnipotence.

Yet vain his efforts—All his wisdom vain,
The hidden *laws* of nature to explain,
Till Newton rose, chief in fair wisdom's van,
The *first* in science, and the boast of man.
He sought out nature in its varied forms
Of softening dews, and widely-wasting storms:
Of pestilential wind which all devours;
Of gentle gales, and earth-refreshing showers;
Of planetary worlds in order rang'd,
Fast moving on—the system still *unchang'd*.

Pervading ether, borne on learning's wings,
He followed nature to its latent springs;
Of all its secret powers explor'd the source:
Centripetal and centrifugal force:
Attracting here—and there repelling far,
The elliptic comet, and the wandering star.

The gravitating power of earthly things :
 The course of tides—their equinoctial springs :
 Of light and tints he true adjustments made,
 Defining colours with the prism's aid :
 Stopp'd at effects, explained their hidden cause,
 And taught the astonished world great nature's laws.

A train of sages after him arose ;
 Their study sacred wonders to disclose :
 They wrote of worlds, and suns, a beauteous host,
 To common sense and simple vision lost.

Others again, of seas and hidden mines,
 Of earth's vast treasures, and its measured lines,
 Of all its beauties, (an exhaustless theme,)
 Descant at large, and laud the wond'rous scheme ;
 Or rather *Him* who formed it great and good :
 First *cause* of all—of all least understood.

Continuing on the philosophic race,
 Some pass'd away, and more supplied their place ;
 Till time had nearly run its ample course,
 And still was hastening to rejoin its source.

Then Sturm appear'd, deep vers'd in Newton's page,
 Diffusing knowledge through this latter age,
 To lead the simple in the path of truth,
 And guide in wisdom's waysunwary youth.
 He spake of fields, and meads—of deserts wild,
 Of rending earthquakes, and of moonlight mild ;
 From mountains vast, in many a distant land,
 Down to the wonders in a grain of sand :
 Of frigid climes, where rest perpetual snows,
 And torrid zone, where heat intensely glows.

He spake of oceans too, and earth's rich store,
 Of lovely coralines, and precious ore :
 Of clouds and mists,—and mist-dispelling rays,
 Of *gradual-coming* night, and rising days.

Ascending still in being's mighty scale,
 He notes the oyster, and describes the whale.

Rising to middle air, he there describes
 The feather'd tribe of every hue and size ;
 The tyrant eagle, and the gentle dove :
 Of power the emblem *that*—and *this* of love.
 The roaming wild beast, and domestic clan :
 (The bane of human kind—the friend of man,)

Are noted too, with philosophic eye ;
With snails that creep, and light-wing'd butterfly.

These are the embryos of his mighty plan :
Which now unfolding, rises into man :
Dissects his form with anatomic care,
Compos'd of fire, and water, earth, and air :
Which modell'd by the forming hand divine,
In perfect symmetry and beauty shine.
A noble structure, rear'd with curious art ;
The *whole* exact—exact in every *part*.
Of all he spake, and taught by simple rules,
The true philosophy of learned schools,
Without their jargon ; lovely all and free,
Like nature's *purest self*, simplicity !

And what through this laborious work his aim ? —
To magnify his great Creator's name ;
Display his power, and spread his praise abroad.
Till infidels, *confounded*, own a God :

To profit those who knew a power supreme,
And gloried in the soul-exulting theme ;
Who fear'd, who lov'd, and joyfully ador'd,
Their body's Maker, and their spirit's Lord.

Thus Sturm design'd, and prosperous was his plan,
Far as his native, nervous language ran :
Yet all was vain to those who knew not aught
Of *German* tongue, by famous *Bachmair* taught :
Nor yet were conversant with *Chambaud's* lore,
To aid in reading *Constance** copy o'er.

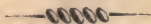
Pity a work so good should be confin'd,
Or *mutilated* transcripts vex mankind :
So reason'd Clarke, and his diffusive soul
Disdaining *partial* good—translates the whole.

Hail blessed pair ! Your great design the same,
'To publish, through his *works*, your Maker's fame !
And when our tribute of respect is paid,
We'll own, that *time* this trifling difference made,
Sturm *went before*, Clarke, *following*, "points the road
That leads through Nature up to Nature's GOD."

M. C

* The lady who translated the second German edition into French.

REFLECTIONS.



JANUARY I.

A MEDITATION FOR NEW-YEAR'S DAY.

I CONSIDER this first day of the year, as if it were the first day of my life ; and dare expect from the goodness of my God as many blessings for the year that commences this day, as I have obtained in any since my entrance into the world to the present time. What favours have I not reason to expect from my heavenly Father, who, from the first moment of my existence, yea, even before I had a being, was occupied concerning me with so much tenderness and goodness ?

At the moment of my arrival in this world he caused me to find parents and friends who assisted me, who have nourished me, and whose disinterested love provided for me in that state of weakness and incapacity in which I was found. Without their succour, without their generous attachment to my well-being, could I have preserved health, and the many other blessings which I now possess ? If at that time I had been able to reflect upon my destiny, I should, without doubt, have promised myself many agreeable hours in the course of my existence upon earth. Now that I am capable of making these reflections, I wish to give myself up to the contemplation of my happiness, and to those pleasing hopes which it invites me to form for the future. I enter with the present year into a new path of life, not so wholly deprived of all things, nor so incapable of assisting myself as I was when I first entered into the world ; but with the same need of supernatural succour that I then had.

I still need the fostering hand of my friends, their consolatory aid when dejected by disappointments, and their protection in those dangers to which I may be exposed. And will not my heavenly Father grant me a blessing so necessary ? Yes, I am certain he will : and whatsoever may happen to me in the course of this year, the Lord has, without doubt, already chosen a friend for me, who in dubious cases shall be my counsellor, and in affliction my support : who shall rejoice with me in my prosperity, and be the stay of my mind in the time of adversity.

From the first moment of my life God has laid the foundation of my future destiny. It was not by accident that I was born of such

A meditation for new year's day.

parents ; in such a part of the world ; and in such a particular time, and not in another. The time, place, circumstances, and consequences of my birth, God has arranged in the wisest order. He then regulated my lot, weighed the hardships which I was to endure, and provided the comforts and satisfactions which should restore calmness and serenity to my mind. After his purposes, many unknown causes must contribute to my felicity, and every thing which stood in any relation to me must concur to accomplish his beneficent designs. With this first day of the new year I may consider my lot as being regulated anew. The Lord, who has given me a being, comprehends, with a foresight which nothing can deceive, every week, day, and instant of this year. Though all that concerns me be hidden from my eyes, yet every thing is open to the eyes of the Lord, and all is regulated according to his purposes, which are ever fraught with wisdom and goodness. If during the course of this year I should meet with some misfortune which I cannot foresee ; if some unexpected happiness should fall to my lot ; if I meet with some loss which I have now no reason to expect, I shall consider the whole as happening according to the wise direction of my God.

Impressed with this conviction, I enter on the journey which commences this day. Whatever may occur, I will confirm myself more and more in the persuasion, that Jehovah shall be my God and my Father in my old age, as well as he has been in my youth. If I find myself exposed to want or distress, I will remember the days of my infancy, a state still more critical, in which the Lord had pity upon me. If I meet with unfaithfulness from any friend, this must not disturb me ; God can raise me up others, from whose tenderness I may derive joy and comfort. Should my life be exposed to persecutions and distresses, which I can neither foresee nor prevent, this shall not terrify me : I will trust in the Lord, who has protected my infancy when it was exposed to a thousand dangers.

What then shall hinder me from beginning this year with tranquillity ? I desire, without anxiety, to look forward, and abandon all my concerns to the direction of the Lord. I wish submissively to follow the path which he shall point out, and to bless him at each step, because he leads me in a way so merciful and safe.

JANUARY II.

BLESSINGS WHICH GOD GRANTS US IN WINTER, TO WHICH WE PAY TOO
LITTLE ATTENTION.

IF we examine the works of God more attentively than we commonly do, we shall find, even in this season, many subjects which may lead us to rejoice in the goodness of the Lord, and to exalt the miracles of his wisdom. Doubtless there are few people so insensible as not to find some emotions of joy and gratitude, when in spring,

Blessings granted us in winter.

summer, and autumn, bountiful nature displays to them the rich bounties of God. But in general, the most sensible hearts feel this sweet sentiment of gratitude excited in them, when they see the fields despoiled of their fruits and of their charms ; when the north wind whistles about their dwelling ; and when the icy cold benumbs the earth and its inhabitants. But, is it really true, that this season is so destitute of the blessings of heaven, as not to be capable of kindling gratitude and piety in the hearts of men ? Doubtless it is not. Let them only accustom themselves to be more attentive to the works of God, more affected with the different proofs of his goodness towards them ; and they will find many occasions, even in winter, to praise their Benefactor.

Consider how miserable you would be, if during this excessive cold, you had neither fire, bed, nor clothing to keep you warm. See with what goodness the Lord has foreseen your wants, and furnished you, even in this season, the most destitute of resources, with the necessaries and conveniences of life ! Perhaps at this moment you feel the sweet influence of the fire : will you not magnify the Lord, who has provided coals and other fuel in such abundance, that even the most indigent can procure what is necessary ? You can lie down in a comfortable bed ; a blessing which ever should excite your gratitude to God ; especially if you consider that there may be many, who, through extreme want, are not supplied with such a safeguard from the cold. *You* have clothing in such abundance as enables you to brave the rigours of winter ; if *you* do not consider this a blessing, think on the state of many of your fellow-creatures, whose chilled limbs are but half covered with rags. If they had but half of *your* clothing, how happy would they esteem themselves ! And will *you* not acknowledge the happiness of your state ? Will *you* refuse to render homage to your beneficent Creator ?

But this is not all. If it were granted to mortals to know the concatenation of causes in nature, how great would their admiration be at the wisdom and goodness of Jehovah ? However incapable we are of conceiving a proper idea of the *whole* of God's works, the little that we can perceive of them will give us reason sufficient to acknowledge, that the Divine government is infinitely wise and beneficent. Winter belongs to the plan which he has laid : if this season did not exist, spring and summer could not have so many charms, the fertility of our land would be greatly diminished, commerce would fail in many provinces, and a part of the woods and forests would have been created to no purpose. Considered in this point of view, winter is, no doubt, very useful ; and supposing that these blessings were not so evident, it would be sufficient to consider, that winter is the work of the Creator, as well as spring and autumn, and that whatever proceeds from him must be good.

Supreme Being ! powerful and beneficent Creator, pardon us, if, through ignorance, we have hitherto found fault with the plan which thy wisdom has formed ! Pardon the ingratitude of which we have

Blessings granted us in winter.

so often been guilty during this season ! Yes, even in winter, thou grantest us more benefits than we deserve ; and more than we can express. If, to the present time, we have viewed them with an indifferent eye ; if we have not understood their worth ; grant that we may, at least for the time to come, be more attentive to, and more sensible of them ! Henceforward, during this cold season, when we feel the sweet influence of the fire, when covered with warm garments, or when we go to our couch to seek the refreshment of warmth and repose ; thou shalt receive our thanksgivings, O thou Preserver of our life ! for the blessings which thy liberal hand dispenses to us during the course of this season.

JANUARY III.

THE DAILY PROOFS OF GOD'S PROVIDENCE.

NOT to acknowledge the footsteps of Providence, except in extraordinary cases, is to betray our weakness and ignorance. In the ordinary course of nature, a thousand things present themselves to us daily, which ought to fix our attention, and excite our admiration. The formation of a child in the womb of its mother, is as great a miracle of the Divine power, as the creation of the first man out of the dust. And the preservation of our life, if we consider the variety of causes and effects which are combined to produce it, is not less miraculous than the resurrection of the dead. The only difference between these two things is, that the one happens but seldom, while we are daily witnesses of the other. Hence it is, that the former does not strike our attention, nor sufficiently excite our admiration.

Certainly, my own experience ought to give me the fullest conviction, that a Divine Providence watches over the preservation of my life. I am not sure of a single moment ! A thousand hidden and unknown causes may shorten my existence ; may freeze my blood, or stop my breath. Alas ! I cannot but feel how incapable I am of preserving my life, or removing this or that infirmity, or of shunning the various dangers which threaten me. Subject to so many bodily maladies, to so much weakness, to so many wants, relative both to my body and soul, as well as to my outward situation ; I am deeply convinced, that without the tender care of my God, I should be a creature extremely miserable.

The union of my soul and body, their continual and reciprocal action on each other, are inconceivable in themselves, and do not depend either on my will or on my power. The beating of the pulse, and the circulation of the different fluids, are carried on in me uninterruptedly, without my being able to contribute to them in the smallest degree. Every thing convinces me, that my faculties, my state, and the duration of my being, do not depend upon my own

will. It is the Lord who, by his secret and absolute power, maintains me in strength, motion, and existence. If my respiration be not stopped ; if my blood continue to circulate ; if my limbs have not yet lost their activity ; if the organs of my senses have preserved their proper functions ; if in this moment I have the faculty of thinking, and the power of my reason, it is to God alone I am indebted for these blessings.

But why should I think so seldom, and with so little gratitude, on the daily manifestations of Divine Providence ? Should not the reflections which I have now been making, be daily impressed upon my heart ? Should I not, at least every morning and evening of my life, meditate on the blessings of my Creator, admire them, and praise him for them ? Is it not reasonable that I should act thus, and by this homage distinguish myself from the insensible brute, and from those other creatures which have not received the faculty of contemplating the works of Providence ?

Divine Preserver of my life ! teach me worthily to contemplate the wonders of thy goodness ! Render my love capable of that exalted piety, which the heart of David felt, as often as he meditated on thy works ! And when thou hast granted me this blessing, may I feel its worth, and may it lead me to glorify thee, and to acknowledge, that thou alone art the source of the happiness of mankind. Then may I apply to myself these words of the pious patriarch, *I am not worthy of the least of all the mercies, and of all the truth which thou has showed to thy servant.* Gen. xxxii. 20.

JANUARY IV.

THE DIFFERENT USES OF FIRE.

FIRE is, in some sort, the universal instrument of all the arts, and helps to supply all our necessities. And to the end that man may have the constant assistance of this element, the Creator has placed it not only in the air and in the water ; but has also enclosed it in all oily and fat substances. How very useful to us are those combustible matters which furnish the fire with that aliment which it requires ! Without a sufficient provision of these matters, we should be deprived of the greatest advantages, and exposed at the same time to the greatest inconveniences. In winter, without the fire, which gives us light, a great part of our time must be spent in insupportable obscurity. Deprived of this artificial light, our most agreeable occupations must end with the setting sun ; and we should be obliged to sit motionless, or wander about with terror amidst a thousand dangers. Consider how melancholy our lot must be, if, in these long evenings, we could neither enjoy the comforts of society, nor use the resources of reading, writing, or labour. Consider how innutritive and unhealthy the greatest part of the aliments which the earth pro-

The different uses of fire.

duces would be, where they are not softened, dissolved, and prepared in certain ways, by the action of fire. And how should we be able to provide so many other necessities and conveniences, if artists had not procured them for us by the help of fire? Without this element we could not give our garments those diversified colours: we could not soften metals, so as to purify and render them ductile; without its aid, we could not transform sand into glass, harden clay, or give to lime the consistence of stone. Without fire, nature, and all her treasures, would soon become almost useless to us, and lose, in our eyes, the greater part of their charms.

But let us confine ourselves to the advantages which we derive from it at this instant. What comfort do we feel in this chamber which is warmed by it, and which defends us from the impression of the external air! During hard frosts, we should be either condemned to inaction, or at least to a thousand disagreeable sensations, if the invigorating fire did not communicate to us a certain degree of activity. How many old and consumptive persons would suffer doubly, were it not for the benign influence of fire! What would become of the poor nursling, if its delicate limbs were not strengthened by gentle warmth! O ye starving poor! who, during this season, feel all the rigour of the cold—ready to sacrifice a part of your small pittance of bread to get fuel to warm your shivering limbs; it is you whom I pity from the very ground of my heart! Your state causes me to recollect a portion of my felicity, to which, until now, I have been too inattentive; and more powerfully impresses on me the duty of gratitude to my heavenly Father for the advantages I receive from the heat of the fire! It also strongly urges me to consecrate what I can spare to support you in those distresses from which I am exempted.

O my God, my Creator, and my Benefactor, condescend to look upon me! Behold, my heart breaks forth unto thee in praises and thanksgivings. It is to thy paternal care that I owe all the advantages, and all the comforts which, through the medium of the fire, I enjoy! It is thou who hast commanded the earth to produce fuel in abundance; and thy bounty provides so amply for our necessities, that there is no portion of the year deprived of thy blessings! I return thee thanks for those which I enjoy at present. Continue to grant me the benign influence of the fire; and may this element never become, either to me or my brethren, the instrument of vengeance!

JANUARY V.

WINTER AMUSEMENTS.

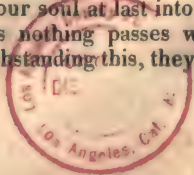
DURING this season, which, through prejudice, so many people consider as affording little pleasure, every one, according to his peculiar taste, endeavours to procure himself such amusements as are cal-

Winter amusements.

culated to divert him, and cause the long winter nights to pass away without weariness. Many, in order to compensate their sufferings by the rigours of the cold, are occupied in nothing else than dissipation, noisy company, or the enjoyment of transitory pleasures. It is distressing to see the efforts which so many persons make, to shorten, by inactivity or trifling pursuits, those days which are already too short. The course of the day is commonly filled with a circle of occupations, which neither correspond to the dignity of the man, nor the instruction of his soul. An hour after sunrise the voluptuary leaves his couch. He projects, during the breakfast hour, the amusements to which he wishes to sacrifice the new day. Again abandoning himself to idleness, he waits for the hour of dinner:—it arrives, he feeds without fear, and gives up himself to the pleasures of the table. Satisfied, or rather overloaded with the immoderate use he has made of his food, he casts himself upon the bed of repose, that he may reacquire necessary strength to support new excesses. The hour comes when he is to go to a tumultuous company, unless the noisy circle is to assemble at his own house. He then falls to play; and for the first time since the rising of the sun he shows that he is endowed with a soul; and with the cards in his hand, the hours pass rapidly away. Finally, this brutish man goes from his cards to his supper, and from his supper to his bed; but there he finds no sweet repose: watchfulness, or terrifying dreams, disturb the hours of the night.

However, this is not the most reprehensible manner of wasting the days, and the long evenings of winter. How ingenious is man to multiply the means of shortening his time by vain amusements! Sometimes the chase calls him to leave the bosom of the town. Then he starts and pursues the fearful hare, or the timid deer, which being run out of breath, falls through its weakness a prey to the hunter, whose inhuman sports disturb the quiet of the country, and the repose of nature. At other times, luxury invites him to the ball, where often he loses, together with his innocence, his health of body and peace of mind. At other times, the pleasures of the play-house enchant him: there vicious passions glide imperceptibly into his heart, or rather are strengthened there: passions which render him incapable of relishing genuine pleasure. At other times, he runs to feasts and other diversions, which too often bring sin in their train.

Perhaps I have marked out a sufficient number of the amusements of winter. May I be permitted, at present, to remind my fellow-creatures of the duties they have to fill in reference to their amusements? I do not blame the strong inclination which people have for society, and which is so particularly necessary to us in this season of the year: but I would say, take heed, lest an innocent desire degenerate into a ruling passion, and bring your soul at last into captivity. Supposing even that in your parties nothing passes which is contrary to virtue and morality; yet, notwithstanding this, they may



become criminal to you, if they take up too much of your time, cause you to neglect the duties of your vocation, or derange the internal economy of your family. Amusement, however innocent, must not be our daily work; it is only for the sake of relaxation that the Creator grants us any thing of this nature. To have too keen a relish for such things, is to run the risk of missing the great end of our being, by seeking an enjoyment which at last may become a source of repentance and remorse. I particularly advise you, to be very attentive to the choice of your social amusements. Do not therefore waste your time in diversions, which you cannot enjoy without injuring your virtue, your reputation, or the well-being of your family. Let not those foolish pleasures, which may hurt your neighbour, excite his complaints, bring tears from his eyes, or separate you from the duties which society and religion impose upon you, ever find an entrance to your heart. Let not the most innocent amusements so far captivate you, as to render you insensible to the pure and solid pleasures of Christianity, or deprive you of your relish for more serious occupations.

O God! do thou thyself govern my heart; and grant that I may never forget thee, in tasting these earthly joys! That, in the midst of my dealings with men, the recollection of thy presence may be a caution to me against all temptations! That I may be always abundantly more attached to the exercise of my duty as a Christian, citizen, parent, &c. than to those pleasures which may so easily turn me from my obligations, or, at least slacken, the zeal which I have for that which is good! But why should we feel so much eagerness for frivolous amusements, whilst even in the days of winter, we find such pure pleasures within our reach?—If we have any taste for the contemplation of the works of God in nature; the starry heavens, the fields covered with snow, and a thousand other phenomena of winter, may serve at once to regale our minds, and to nourish our piety. For, in winter also, the works of the Lord are great, sought out by all those who have pleasure therein; and he who wishes to meditate upon them, shall enjoy continual and diversified pleasures.

JANUARY VI.

GOD'S PROVIDENTIAL CARE OF ANIMALS DURING THE WINTER.

THE innumerable hosts of rational beings dispersed over the different nations of the earth, are provided at this season with every thing necessary to supply their wants, and render life comfortable. The greater the number of men is, the more their wants are varied, according to their condition, age, and manner of life; the more incapable we are of forming a plan, and taking the necessary precautions, for the preservation of life; the more those arrangements, full of wisdom and goodness, which our Creator has made for this purpose,

God's providential care of animals in winter.

deserve our attention and admiration. But there would be a sort of selfishness in restraining the Divine wisdom and goodness to the preservation of the human race alone, without recollecting that care which his providence takes of other animals during the winter: a care which extends itself to creatures abundantly more multiplied over the face of the earth than the intelligent beings which inhabit it. However miraculous the preservation of the human species may be, we can say, with the strictest truth, that the care which the Divine Providence takes of other animals, is a still more astonishing proof of the wisdom, almighty power, and goodness of God.

That the prodigious number of animals which swarm on our globe, should find in summer both dwelling-places and nourishment, is not so surprising; because all nature is then disposed to accomplish this end. But, that in the present season, these innumerable creatures, these millions of quadrupeds, reptiles, fowls, insects, and fishes, should continue to exist, is a circumstance which must excite the astonishment of every person who is capable of reflection. Nature is so constituted, that the greater part of the animals are provided with a covering by which they can easily withstand the cold, and thus procure their nourishment as well in winter as in summer. The bodies of the wild beasts, which inhabit the deserts and the forests, are formed in such a manner, that the hair which covers them falls off in summer, and being renewed towards winter, becomes a fur which enables them to bear the most intense cold. Other kinds of animals find an asylum under the bark of trees, under old ruins, in the clefts of rocks, and in the caverns of mountains, when the cold obliges them to quit their summer residence. Into these retreats, some carry beforehand the provisions by which they are to be nourished: others live on the fat which they have amassed during the summer; and lastly, others pass the winter in a profound sleep. Nature has given to different kinds of birds an instinct, which leads them to change their climate at the approach of winter; and we see them fly in flocks to warmer climes. Many animals which are not destined to travel, find, notwithstanding, in this season, what is necessary to supply their wants. Birds know how to discover insects among the moss, and in the clefts of the bark of trees. Various kinds of quadrupeds carry provisions, during the summer, into their dens, and feed on them during the winter. Other animals are obliged to search under the snow and ice for that which is necessary for their support. Different kinds of insects, fowls, and fishes, shut up in marshes, and in rivers frozen over, are deprived of nourishment during the winter, and nevertheless are preserved. And there are probably many other means which are still hidden from our eyes, which Divine Providence makes use of for the preservation of animals.

O Christian! adore, with me, our almighty and beneficent Preserver! Notwithstanding his majesty and grandeur, he does not disdain to pay attention to the weakest creature which exists under heaven. From the *elephant* to the *mite*, all animals are indebted to

 God's care of animals during winter.

him for their habitation, their nourishment, and their life. And, where nature herself seems barren, and destitute of resources, he finds out means to supply her defects. Let this consideration strengthen thy confidence in God. O thou of little faith, how canst thou admit inquietude, anxious care, or distress into thy heart; or despair of thy preservation during the days of winter? "The God who nourishes cattle, will not abandon man. He who shows himself great in little things, will show himself more so in those which are great."*

That God who furnishes a covering for animals, knows how to clothe thee. That God who points out to them the caves of the mountains as places of refuge, will teach thee to find an asylum in which thou mayest peaceably spend thy days. That God who has prepared for them, even under the snow and ice, that nourishment which is proper for them, will provide for thy subsistence, even in the most critical times.

Finally, let these reflections excite thee to imitate, as far as thy faculties will admit, the generous care of Divine Providence, in contributing to the preservation and comfort of thy fellow creatures; and what is more, to the well-being of every other living creature. To show cruelty to animals, to refuse them that nourishment, and those conveniences which are necessary, is to act manifestly against the will of our common Creator, whose beneficent regards are extended to those creatures which are inferior to us. And if the brute creation have a positive right to our care, how much more are we obliged to soften, as much as is in our power, the distresses of our fellow creatures? Do not be contented to procure merely what may supply thy own necessities; but endeavour to provide something for the support of others: and let it never happen, that any creature has perished through lack of receiving that support which it was in thy power to afford.

 JANUARY VII.

THE CHARMS OF WINTER.

EVERY season has pleasures and beauties peculiar to itself: and even the winter, however deprived of charms it may appear to some persons, fulfils also in this respect, the design of the Creator. In behalf of those who, through ignorance or prejudice, murmur at this season, I am going to detail those pleasures which it procures for our senses, and for our hearts.

Is it not a most delightful spectacle to behold the dawn shine over a landscape covered with snow? The thick fog which vailed the

* In the German thus:

Der gott, der Thiere naehrt, wird menschen nicht vertossen,
Wer gross im Kleinen ist, wird grosser seyn im grossen.

 The charms of winter.

earth, and hid its objects from our sight, is suddenly dissipated. A light hoary frost whitens the tops of the trees : the hills and the valleys are differently coloured, by reflecting the beams of the sun, whose benign influence gives new life to all creatures ; and seems to invite the titmouse to quit the thickets, and the sparrow to flutter from branch to branch. In proportion as nature seemed dead during the absence of the sun, in the same proportion she is animated on his appearing again ; and in her hoary garments, cheers the eyes of the traveller. Have you ever considered, with attention, the formation of the snow ? Have you ever reflected on the wonders which a single flake of this substance exhibits ? Admire, on the one hand, the regularity and symmetry of its shape, and on the other, the infinite number of flakes which fall from the air. What a pleasing sight to view the hills, the forests, and the thickets, clothed with such dazzling lustre ! What a charm results from the assemblage of all these objects ! Behold, (for the eye can never be satisfied with this sight, however it may be accustomed to it) behold the brilliant dress of those hedges ! see the forests bend under the white curtains which cover them ! The whole presents to our view the appearance of a vast desert, over which a uniform vail of dazzling white is extended.

What idea shall I form of those who, at the sight of "such phenomena, feel nothing, or do not experience that pleasure which the Creator designed to afford them ? And as for you, who really murmur against the laws of nature, how much are you to be pitied ? If the appearance of nature in winter be not pleasing to you, I am afraid that spring itself, with all its charms, will find you equally insensible. Come ye, who reverence your Maker, and see and taste how good the Lord is ; how adorable is his wisdom, and how unbounded is his goodness, even in the things which relate to the winter. However desolate nature may appear in our eyes, she is, nevertheless, a master-piece of Divine workmanship ; and it is our blindness alone which hides her beauties. Some rays of the Divine wisdom shine forth in every part ; but how many more are hidden from us ! We do not follow nature in all her ways, and we are only attentive to those things which strike our senses or flatter our passions. In this, many bear a near resemblance to the brute, who sees the sun, the snow, and other phenomena of nature, without ascending to that God from whom all that occurs in heaven and earth proceeds.

Reader ! with what satisfaction shall your soul be filled, if you accustom yourself to consider attentively the works of God in this season of the year ! The air may be agitated around you, the heavens may become tempestuous, and nature be despoiled of her sweetest attractions ; but your soul may taste true pleasure, by beholding in all things the footsteps of the wisdom, power, and goodness of your great Creator. However bounded your natural faculties may be, you will always find sufficient matter here to interest your senses and your understanding. You will feel no occasion to seek, with anxiety, the dissipations of the world, or the amusements of dancing and gaming.

The charms of winter.

You will find, whether alone, or in the circle of your children and friends, pleasures always genuine, and always new.

O my soul, accustom thyself to taste these delights ! Let the works of God often occupy thy thoughts ; and such meditations will soften the asperities of life. Ascend toward God, by the ladder of created beings ; and in all times, and in all seasons, he will be the object of thy praise.

JANUARY VIII.

OF THE VEGETABLES WHICH PRESERVE THEIR VERDURE IN WINTER.

THE earth may now be compared to a mother who has been bereft of her most promising children. She is desolate and despoiled of those charms which variegated and embellished her surface. Nevertheless, she is not deprived of all her children : here and there we discover vegetables which seem to brave the rigour of winter. Here, the *wild hawthorn* shows its purplish berries ; and the *lauristinus* discloses its flowers, disposed in bunches, crowned with a foliage which never withers. The *yew-tree* elevates itself like a pyramid, and its leaves have preserved their verdure. The feeble *ivy* creeps still about our walls, and remains unshaken, while the tempest roars around it. The *laurel* extends its green branches, and has lost no part of that dress which adorned it in summer. The humble *box-tree* shows here and there, among the snow, its verdant branches. These trees, and some others, preserve their verdure in the coldest climates, and in the most rigorous seasons. They are emblematic of the durable advantages which he possesses, whose mind is well cultivated, and whose disposition is sweet and pliant. The lustre of dress, which dazzles only the eyes of the vulgar, is a frivolous and transitory lustre ; the shadings of the most brilliant tints fade ; all exterior graces have but a short duration ; but virtue has charms which survive them all. “ The man who fears the Lord, is like a tree planted by the side of a river ; he grows, and extends his branches afar ; he brings forth fruit in his season, and his leaves wither not ; he comforts those who seek the shade, and the traveller blesses him.”

How amiable is the pious man ! He borrows not his beauty from the external and arbitrary goods of fortune ; his true ornaments are within. The tempests of adversity may at times shake him ; but they can never cast him down : and shortly his head shall be raised far above all stormy regions. If unexpected misfortunes reduce him to poverty, he is still rich, because he possesses the approbation of God : has a good conscience, and a hope full of a blessed immortality. While he beholds those falling around him who were proud of their riches, and rebelled against God, he remains firm ; his noble humility defends him from falling ; for the Lord holds him by his right-hand, and does not suffer him to stumble.

Of vegetables which preserve their verdure in winter.

This meditation leads me to the idea of a venerable old man. In the winter of his life he resembles those plants, which during this season of the year, still preserve their verdure. How many storms of life has he borne with constancy ! How many alluring objects has he seen wither ! He still lives, while the greater part of those who appeared at the same time with him upon the earth have been taken away. A pleasing sprightliness, the happy remains of his spring time, is still discoverable in him. However wrinkled his forehead may appear, whatever ravages the hand of time may have made on his body ; he is still adorned with those virtues which recompense him for the loss of external beauty. He blooms again in his children, and his wisdom, uprightness, and consummate experience, serve still as an example and a lesson, even to his great grand children.

O that the winter of our life may have so many charms ! May we, after having lost all the attractions of youth, and of that maturer age in which we boasted, bloom again in our old age as a faithful tree, and inspire by our virtues, veneration and love ! In a short time, the beauty of our bodies shall fade as the summer flower : happy, if at that time, we shall have no cause to regret its loss ! Happy, if then we shall be found adorned with those attractions which spring from wisdom and virtue, and which the grave itself shall not be able to destroy.

JANUARY IX.

THE SINGULAR STATE OF MAN WHEN ASLEEP.

WE need not have recourse to extraordinary events, to understand the almighty power and wisdom of God. The most common occurrences, together with the daily changes which are brought about in nature, are alone sufficient to convince us, in the most forcible manner, that the Being who has created the world, and who directs all events, is infinitely wise, infinitely powerful, and good. Of that vast number of miracles of which he is the author, I shall mention at present only one ; and though it occur every day, it nevertheless highly deserves to be remarked, and to become the object of our admiration. How often have we been refreshed and strengthened by sleep ! and perhaps have never reflected on that state ; or, at least, have not considered it as one of the most remarkable effects of Divine goodness. We think that nothing extraordinary happens to us when we are overtaken by sweet sleep ; we believe that the machine of our body is adapted to that situation, and that the desire we have for sleep comes from causes purely natural. Sleep has two appearances under which it may be considered : on the one hand there is nothing found in it that does not necessarily result from our nature : and, on the other, there is something so striking and marvellous in this natural

effect, that will abundantly recompense our trouble in considering it more attentively.

First, it is a proof of the wisdom of the Author of our being, that we sleep imperceptibly to ourselves. Endeavour to spy out the instant in which sleep comes to seize upon you :—that very attention will be an obstacle to its approach ; nor can you fall asleep, till the idea be completely dissipated. Sleep comes without being called for ; it is the only change in our mode of existence, in which reflection has no part ; for the more we endeavour to procure it, the less we succeed. Thus God has ordered sleep in such a manner, that it becomes to man an agreeable necessity ; and he has made it independent both of our reason and will. Let us extend this meditation, and consider the wonderful state in which we are found during the time of sleep. We live without knowing or feeling it. The pulsation of the heart, the circulation of the blood, the digestion of the aliments, the secretion of the various juices ; in a word, all the animal functions continue, and are carried on in the same order.

In some respects, our souls seem to have suspended their activity ; and in a little time we lose all sensation, and every distinct idea. The senses appear dead ; and all their accustomed operations are interrupted. The muscles, by degrees, move more slowly, till at length all voluntary motion ceases. This change takes place first in the forehead ; then the muscles of the eyelids, neck, arms, and feet lose their activity to such a degree, that the man seems transformed into a plant. The state of the brain becomes such, that it cannot transmit to the soul the same ideas which it does when we are awake. The soul discovers no object, although the optic nerve is unchanged, and the eyes wide open. The ears are open, and yet they hear nothing. In a word, the state of a person asleep is marvellous in every respect ; and there is but another state in which man can be upon earth which is equally remarkable ; and this first is evidently its image. The state which I refer to, is that into which we are brought by death. Sleep and death nearly resemble each other ; and are full of conformities which it may be useful to consider. Who can well think of sleep, without also taking a view of death ? As imperceptibly as we at any time fall into the arms of sleep, so imperceptibly shall we one day fall into the arms of death. It is true, that death often announces his coming, some hours and days beforehand ; but the very moment in which the sleep of death comes to seize on us shall arrive suddenly and the moment we appear to feel its stroke, is the last of our existence here.

The senses, whose functions were interrupted during sleep, are equally incapable of acting at the approach of death. In the same manner the ideas become confused ; we forget the objects which surround us : yea, we forget even ourselves ! Probably, the moment of our death may be as pleasant as the moment in which we begin to sleep. The convulsions of the dying often cause them as few dis-

The state of man when asleep.

agreeable sensations as the grinding of the teeth, or snoring, cause to those who are asleep.

Let our piety often renew this meditation. Whenever we seek repose on our bed, let us think on the wonders of this refreshing sleep, and bless our Preserver, who, even when we slumber, works such great things in our behalf. Yes, undoubtedly, great indeed ! for, if there were not a protecting hand over us, to how many dangers might we fall a prey during the night ? If God had not directed and supported the pulsations of our heart, the circulation of our blood, and the motion of our muscles ; the first sleep that had followed our birth, would have delivered us into the hands of death. And if he had deprived us of the blessings of sleep, long ere this we should have lost both strength and life. Let us reflect attentively on all these things, and our hearts will point out to us the duty we owe to our great Benefactor. Then, full of joy and gratitude, we shall bless the Lord, who proves himself to be our God in all the circumstances of life

JANUARY X.

THE ADVANTAGES OF THE CLIMATE WHERE WE DWELL.

DO we feel in a proper manner how happy we are in divers respects ? Truly the blessings of our heavenly Father are poured out upon us on every side. The aspect of our forests, meadows, and hills ; the pure and temperate air which surrounds us day and night ; the seasons of the year, and the variations which accompany them, all announce to us the goodness of God, and the extent of our happiness. And, can we complain of the lot which God has given us ? Of the economy with which he distributes his favours ? Shall we murmur, because we have not a perpetual summer ; or because the rays of the sun do not always cheer us : or because an equal degree of heat is not always felt under our zone ?

What ingratitude ! and at the same time what ignorance ! Truly, we know not what we desire, nor of what we complain. It is through inadvertency, or pride, that we do not acknowledge the goodness of God, which has particularly favoured our climate ? We often murmur against the rigours of winter, and we are foolish enough to envy the places, where the vicissitudes of seasons are unknown. In warm climates, people are more exposed to epidemic disorders, than in those on which the sun shines with less ardour ; nor is life itself so prolonged in those countries as in ours. Besides, it is remarked that men are not so robust, and that the population is not so great in those climates as among us. And even when the cold is at its highest possible degree in our climates, we are much more happy than the inhabitants of those countries are, where the cold is far more keen and constant, in comparison with which our most rigorous winters would pass for the temperature of autumn. Compare, in idea, your lot

The advantages of the climate where we dwell.

with that of the inhabitants of the northern part of our globe. Here, some of the sun's beams illuminate our cloudy days, and reanimate our minds. There, the days resemble nights, which are not cheered by a single ray of that beneficent luminary. Here, through the means of our fire and bed, we can always brave the rigours of the cold. There, on the contrary, people are disturbed and attacked by ferocious beasts, which they dread more than the cold; nor can their wretched huts afford a shelter against either of those enemies. Among us, the charms of society soften the inconveniences of winter; but the unhappy mortals who dwell within the polar circle, are almost separated from the rest of mankind, and live dispersed about in hordes. We have the happiness of seeing the succession of day and night, while these miserable people pass the greater part of their time in darkness. Finally, and this is the most essential advantage, after three or four stormy disagreeable months, we enter on a season, the charms of which comfort us, and cause us to forget all we have suffered. On the contrary, those can only contemplate nature in a state of constant death, without ever seeing it revive, for with them an eternal winter reigns.

Let us bless the beneficent hand which assigns us so happy a lot! Far from murmuring against it, let us glorify the Lord, who has regulated it with so much wisdom and goodness. And if at present, in our houses, or in the society of our friends, we spend the days of winter in an agreeable manner; let us think of our unhappy fellow-creatures who are deprived of these pleasures, the frequency and abundance of which cause us to forget their worth. And, when we examine nature, such as she appears to us in those countries, let us say to God, penetrated with gratitude and joy, "I render thee thanks, O Lord, for having fixed my abode in a climate where, during each season, thy goodness is manifested with so much magnificence. May my joy and gratitude, may my efforts to please thee, be proportioned to the blessings which I enjoy beyond other people. May the fertility and delights of the country, in which thou hast caused me to be born, excite me to study and contemplate thy works and thy benefits! O my Creator, and my Father, how much will the image of this felicity one day transport me! One day, I shall come to that celestial habitation, those abodes of blessedness and perfection, which Jesus Christ has prepared for me, where I shall adore, with all the nations of the world, the miracles of thy goodness!" Amen.

JANUARY XI.

THE FERTILITY WHICH SNOW COMMUNICATES TO THE EARTH.

IF we consider appearances only, we might say, snow cannot be very useful to the earth; and should be rather led to believe, that the humid cold imparted by it, might be injurious to trees and plants. But the experience of all ages should free us from this prejudice. By

The fertility which snow communicates to the earth.

this we are taught, that in order to protect corn, plants, and trees, from the dangerous influence of the cold, nature could not give them a better covering than the snow. Although in itself it is cold; it nevertheless shelters the earth from freezing winds: it maintains the warmth which is necessary to the preservation of seeds; and even contributes to dilate them by the nitre with which it is impregnated. Thus, in this early season, God prepares what is necessary for the support of the beings he has formed; and provides beforehand for our nourishment, and that of an infinite number of other creatures. Nature is always active, even in the time when it appears to rest; and it renders us real services, even when it appears to refuse them. In this also, let us admire the tender care of Divine Providence.

See how, in the roughest season, Providence is employed for our comfort; and how, without our labour or assistance, it is silently preparing all the treasures of nature. With such striking proofs of God's beneficent care, who can give himself up to anxiety or distrust? What God does every winter in nature, he also does daily, for the preservation of the human race. What appears to us at first useless or injurious, contributes in the end to our felicity. And often when we believe that God ceases to act for us, it is then that he is forming plants which are hidden from us; and which in being developed, work our deliverance from this or that adversity; and procure us such blessings as we could not have dared to hope for.

But God has not only designed that the snow shall cover the earth; but that it shall fertilize it. How much care and labour do we use to give that quantity of manure to the land which is necessary! And how easy is it for nature to accomplish this end! The snow which possesses this virtue, is more profitable than the rain, and than all other manures. When it is thawed by the sun, or gradually dissolved by the warm air, the nitre which it contains deeply penetrates the earth, and vivifies the various tribes of plants. Who can help remembering the emblem under which God represents the salutary efficacy of his word: *As the rain cometh down, and the snow from heaven, and returneth not thither again, but watereth the earth, and causeth it to bring forth and bud; so shall the word be that goeth out of my mouth; it shall not return unto me void, but shall accomplish that which I please, and prosper in the thing whereto I sent it.* Isa. lv. 10, 11. We live in a time in which this prediction is accomplished in the most striking manner. While provinces, kingdoms, and large portions of our globe, which were formerly buried in ignorance, superstition, and unbelief, are now illuminated by the Gospel. And with what a blessed efficacy is the word of the living God still accompanied! Over how many hardened hearts has it triumphed; how many good works, how many fruits of piety, has it produced! Oh, may Divine grace ever find our hearts a soil properly disposed to feel its salutary influences! Amen.

JANUARY XII.

CONTEMPLATION ON THE STARRY HEAVENS.

THE heavens exhibit to our view, in the night season, a marvellous sight, which should excite the astonishment of every attentive observer of nature. But how comes it that so few people attentively consider the firmament? I hope that *ignorance* only is the cause with the greater part; for it is impossible to be convinced of the grandeur of the works of God, or contemplate the majesty of the Most High, without feeling an ecstasy which has something of heaven in it! I wish my reader to partake of this Divine pleasure. To this end, raise your thoughts to heaven. It will suffice for me to name to you those immense bodies which are dispersed through the vast space, to fill you with astonishment at the majesty of the Workman.

In the centre of our world, the *sun* has established his throne. This luminary is at least 1,380,000 times greater than the earth, and is distant from it at least 95,000,000 of miles! Yet, notwithstanding the prodigious distance, he has the most sensible influence upon our sphere. Seven globes, which we term planets, move round the sun. These are opaque bodies, which receive light and heat, and perhaps their inward motion, from the sun. *Herschel, Saturn, Jupiter, Mars, the earth, Venus, and Mercury*, are the names of these seven primary planets. Of these seven globes, *Mercury* is the nearest to the sun; and it is on this account, that he is, in general, invisible to astronomers. As he is about fourteen times less than our earth, he scarcely contributes to beautify the firmament. He is 37,000,000 miles distant from the sun. *Venus* follows him; and we sometimes call her the *morning*, sometimes the *evening*, star. She is (for her size) the most luminous of the heavenly bodies, whether she precede the rising of the sun, or succeed his setting. She is somewhat larger than our earth; and is distant from the sun about 68,000,000 of miles! After *Venus*, comes our *earth*, round which the moon moves as a secondary planet, distant from the sun 95,000,000 of miles. *Mars* is the fourth planet, and is seven times smaller than our globe; his distance from the sun is about 144,000,000 of miles. *Jupiter*, with his belts, distinguishes himself always by his light in the starry vault. To the naked eye his magnitude surpasses that of any of the fixed stars. He shines nearly equal to *Venus*, when she is in all her splendour, only his splendour is not so vivid as that of the evening star. His distance from the earth is 490,000,000 of miles. How little is our earth in comparison of *Jupiter*! Fourteen hundred globes as large as our earth, would scarcely make one equal to *Jupiter*! Next comes *Saturn*, with his ring, at the distance of 900,000,000 of miles from the sun, and is 1000 times larger than the earth! The planet *Herschel*, or *Georgium Sidus*, is the last in our system which has hitherto been discovered:

Contemplation on the starry heavens.

it is 1800 millions of miles distant from the sun, and 20 times larger than the earth.

The sun, and all the planets which accompany him, are but a point in comparison of the vortex of nature. Each star which appears to us no larger than a brilliant in a ring, is in reality an immense body, probably equal to the sun in dimensions and splendour! Every star is not only a world, but the centre of a planetary system! And it is in this light that we should consider the stars which burn over our heads, in the winter nights. They are to be distinguished from the planets by their sparkling light, and by their always occupying the same place in the heavens. According to their apparent greatness, they are divided into six classes; and all put together make up about 3000 stars, according to Mr. Flamstead's catalogue. But though men have endeavoured to determine their number, it is certain they are innumerable. The number of stars apparent here and there, which the most piercing eye cannot perceive but with difficulty, will, of itself, show that the attempt to make the calculation must be in vain. Telescopes, undoubtedly, have opened to us new points of view in the heavens, and have discovered to us some thousands of stars: but it would be a most foolish pride in man, to wish to determine the limits of the universe by those of his telescope.

If we reflect on the distance of the fixed stars from our earth, we shall have new reason to admire the immensity of the universe. Our senses alone discover to us that the stars must be much further distant from us than the planets. Their apparent smallness arises only from their being at such a distance from the earth. In fact, this distance cannot be measured: a cannon-ball, supposing it could preserve the same velocity, would not reach the nearest of the fixed stars in 600,000 years! What then are these fixed stars? Their prodigious distance, and their splendour, tell us:—they are *suns*, which pour down upon us, not a borrowed light, but a light which is essentially their own. They are suns, which the Creator has sown by millions in illimitable space, each of which is accompanied by many terrestrial (or such like) globes, which it is destined to warm and illuminate.

However surprising these observations may appear, they have only led us to the first limits of the creation. If we could dart beyond the moon, and approach the planets: if we could reach the most elevated star above our heads, we should discover new heavens, and new suns; new stars, and new systems of worlds; and perhaps still more and more magnificent. But all these would not fix the bounds of the empire of the Great Creator, and we should observe with the utmost astonishment, that we were only come to the frontiers of the place of worlds! Little as we know of his works, it is sufficient to induce us to admire the wisdom, power, and infinite goodness of our adorable Creator.

Reader! stop here and reflect.—How great must that God be who has created all these immense globes! who regulates their revo-

 Contemplation on the starry heavens.

lutions, and whose powerful hand governs and supports them ! And what is this speck of earth which we inhabit, with all the magnificent scenes which it exhibits, in comparison of the extent and beauty of the firmament ! Though this earth were annihilated, its absence from the universe would be no more observed than a grain of sand from the sea shore ! What, in comparison of these worlds, are provinces and kingdoms ? Nothing but atoms, which sport in the air, and are only perceivable in the rays of the sun ? And what am I when I reckon myself among the infinite number of the creatures of God ! I am lost in my own nothingness ! But, however little I may appear to myself here, how great do I find myself in other respects ! “ How beautiful is this starry firmament, which God has chosen for his throne ! What more admirable than the celestial bodies ! Their splendour dazzles, their beauty enchants me. Nevertheless, however marvellous and richly adorned this heaven is, it is destitute of intelligence : it does not know its own beauty : and my feeble clay, which God has kneaded by his hand, is endued with sense and reason.”

I can contemplate the beauty of those radiant globes : what is more, I can, in a certain measure, know their sublime Author, and take a glimpse of some rays of his glory. Oh ! may I attach myself more and more to know him and his works ; and may this be my occupation, till he shall raise me above planets, suns, and worlds ! Amen.

 JANUARY XIII.

 THE DISCOVERIES WHICH HAVE BEEN MADE BY MEANS OF THE
 MICROSCOPE.

NATURE is the same in little objects as she is in great ones : there is not less regularity and harmony in the structure of the mite than in that of the elephant : the only difference is, that the weakness of our sight does not permit us to penetrate the nature and organization of small bodies, which often escape our notice, nor do we get a proper discovery of them but by foreign assistance. The microscope has discovered to us a new world, both of vegetables and animals. It has showed that the objects which were invisible to the naked eye, have extension, difference of parts, and peculiarity of figure. Let us produce some examples to induce us to praise God, whose glory manifests itself so wonderfully in the smallest objects.

Every grain of sand appears round when we examine it by the naked eye ; but by the help of the microscope, we remark that one grain differs from another, not only in figure, but in size. Some are perfectly round, some square, and others conical ; but the greatest number are of an irregular figure. But what is still more astonishing, by microscopes, which magnify objects millions of times more than their natural size, we discover in a grain of sand a new animal world ; for their cavities are found to be the dwelling-place of insects

In cheese are found little worms which we term *mites*, each of which appears but as a point to the naked eye ; but seen through a microscope, they are insects of a very singular figure. They have not only eyes, mouth, and feet, but also a transparent body, covered with long hair in the form of needles or prickles. As to the vegetable kingdom, we find it in the *mouldiness* which ordinarily attaches itself to damp bodies. This presents to our view a thick forest of trees and plants, whose branches, leaves, flowers, and fruits, may be clearly distinguished. The flowers have long stems, white and transparent ; before they open, the button is only a small green ball ; nor does it become white till after it has blown.—Little as we might have expected to discover these objects in the mouldiness before mentioned, as little should we have expected to find that the dust which covers the wings of a butterfly was a collection of little feathers, had not the microscope proved this to be the case. But we have no need to extend our researches to things at a distance, let us confine our inquiries to those which concern ourselves. Examine the surface of your skin with a microscope, and you will find that it resembles the skin of a very scaly fish. So small are these, that one grain of sand can cover 250 of them : and as one scale covers 500 pores, consequently a space equivalent to a grain of sand, includes 125,000 pores !

Thus you see how great your Creator is in things which prejudice has taught us to consider as trifles ; and how immense the number of creatures is which he has scattered over the surface of the earth ! What we see is the smallest, and perhaps the meanest part of the works of God. How many objects in nature are hidden from our eyes ! We already know about 30,000 different plants, and some thousands of species of insects. But what are these in comparison of the whole ? If the bottom of the sea, and the beds of rivers, were open to our eyes ; if we could transport ourselves to other planets, how much would our astonishment be increased at the immense number of the creatures of God ! And that which should appear most wonderful, is, that God has employed as much wisdom in those little objects, as he has manifested in those that are great. Nature shows herself as regular in her smallest productions as she does in those prodigious bodies, the circumference of which we calculate millions of miles.

The Creator provides with the same goodness for the necessities of the insect which creeps in the dust, as he does for those of the whale, which appears an island in the midst of the waves. In this respect, imitate the example of the Deity ! Let the meanest creature prove thy kindness, seeing our common Author does not disdain to preserve its existence.

JANUARY XIV.

THE ADVANTAGES OF NIGHT.

WE are, doubtless, deprived of some pleasures when the sun withdraws his light from us, and the greater part of our time passes away in the *darkness* of the night. Nevertheless, we have no reason to complain of this arrangement in nature. As the mixture of pleasure and pain, of natural good and natural evil, is wisely ordered; so also we find the wisdom and goodness of God in this remarkable variation which is found in our climate; and we have a right to assert, that the winter nights are more advantageous than injurious to us; or at least that their apparent inconveniences are compensated or sweetened by a thousand blessings, but too little acknowledged.

Are we well assured, that we should have considered the utility of the sun, or that his light would have excited the same sentiment of pleasure in us, had we not been led to estimate its worth by a privation of its advantages? Each night may recall to our mind the goodness of God, who, for the comfort of man, has spread light and beauty over the face of the whole earth. And it may also assist us to consider the misery in which we must pine, if daylight were not to succeed to the shades of the night. And is not darkness itself advantageous to us, by inviting us, through the silence and tranquillity which then reigns, to seek refreshing sleep! How many labourers are there, who, during the day, exhaust their strength in our service; and whose severe labour is rendered yet more vexatious by disagreeable sensations; who bless the night which suspends their labours, and brings them refreshment and rest! In general, we show too much of a selfish spirit, in measuring the advantages and inconveniencies of the night only by the profit or loss which we suppose we derive from that season. If the long nights are disagreeable to some, to how many others are they a blessing! In certain cases, the night favours the hunter and the fisherman: without it, could astronomy help us to form an idea of the distance, magnitude, revolutions, and infinite number of the stars and planets? And could the pilot make use of the polar star if the day were continual?

Considered in another point of view, the night appears more beneficial to us, in diminishing our wants, which, during the course of the day, not only cost us many cares, but also consume our estate. How expensive are the conveniencies and comforts of life, without which, we should think we had but half an existence! How many families, pressed by want, begin the day with anxiety, and finish it in toilsome labour! Night appears, and anxiety and wretchedness are suspended. To be comfortable, nothing is necessary but our beds; and when sleep closes our eyelids, our wants are satisfied. Night equalizes the condition of the beggar and the monarch; both enjoy a blessing which no money can procure.

The advantages of night.

How good is that Being, who has adapted all things to the good of his creatures ! Most of those matters which we call inconveniencies and evils, are only such to those who permit themselves to be guided by false views and passions ; when considered as they should be, we shall find, that these apparent evils are real advantages to the world.

We may be assured, that many millions of our fellow-creatures, who have spent the day in fulfilling unprofitable tasks, or in painful labour ; that others, who have groaned during the day under the yoke of the oppressor of humanity ; and that a number of travellers, both by land and sea, will praise God at the approach of the night, which brings with it the blessings of repose. Let us also bless him at the commencement of each night : and we shall surely do so, if we have had wisdom properly to employ the day, so as to acquire a right to expect refreshing sleep. The shorter the present days are, the more value we should set on every hour, and make a wise use of our moments. That night is at hand, in which it will be impossible for us to walk or work : but even this long night will be a benefit to us, if we enjoy, in the other world, that peace and rest which are the fruits of a life spent to the glory of God. How sweet shall such a rest be !

JANUARY XV.

REFLECTIONS ON MYSELF.

IT is reasonable to turn my attention sometimes from foreign objects, and place it on myself. Too often it has happened, that while I meditated on surrounding objects, I have lost sight of myself, or, at least, I have not endeavoured to excite my heart to that gratitude and veneration at the view of the starry heavens, or at beholding the blessings of the earth, which these things should naturally produce. I wish now to be employed in what more intimately concerns my structure ; in order to be convinced, more and more, that as man, I am not less a masterpiece of the Divine wisdom and power, than those prodigious bodies, the magnitude of which astonishes my imagination.

How admirable is the union of my soul and body ! And how incomprehensible is their action on each other ! I daily find, that when the rays which illuminate the objects around me, touch my eyes, my soul receives the idea of the magnitude, figure, and colour of these objects. I perceive that when a certain agitation, or undulation, is made in the air, my soul receives the idea of sounds. By this means I have the perception of a thousand changes which take place around me ; and even of the thoughts of other persons. Every moment I feel that, when my soul desires it, my body transports itself from one place to another ; that it exercises its power upon my arms, my hands, my feet ; and that, in fine, all the members of my body are disposed, every moment, to obey each act of my will. All these are incontestable

facts ; and yet I cannot explain the manner in which these things are performed. In this reciprocal influence of the soul upon the body, and of the body upon the soul, there is a wise and marvellous art which I cannot fathom ; and the result of my researches on this point is, surprise and admiration.

If I consider my body separately, I find it also a masterpiece of Divine workmanship. Nothing is superfluous, nothing deficient. Every member is put in the most convenient situation, whether for the ornament or service of the body. Could I desire another member than those which compose a well-formed body ? Suppose that one member were wanting or transposed ; that my eyes, for instance, were attached to my feet, or situated where my ears are, what inconveniencies and deformity would be the consequence ! Thus I find that the external part of my body is disposed with much wisdom. But the arrangement of its inward parts is still more admirable. My body must answer more than one end, and fulfil a variety of functions. It must be the medium through which the soul receives information of the different ways in which outward objects present themselves. The organs of sight, hearing, smelling, tasting, and feeling, accomplish this end ; and each of them is a miracle of the Divine power and wisdom. That the body may be capable of transmitting to the soul different sensations from external objects, it is necessary that it should be moveable : and how many are the parts which concur to produce this end ! The bones, the joints, the ligaments, the muscles or fleshy parts, susceptible of extension and contraction, give me the capacity of moving my body a thousand different ways. But, a machine so wonderful as my body is, must, by its motions and the performance of its functions, suffer a continual loss. It is necessary, therefore, in order to the preservation of the machine, that this loss should be repaired. Thus other parts, besides those we have named, are necessary ; some to receive the aliments, others to grind them, to separate their nutritious juices, and to circulate these juices through the body, and to distribute to each member just as much as is necessary. All these parts are really found in our bodies ; and each of them perfectly accomplishes the end to which it was destined.

I bless thee, O Lord, because thou hast so wonderfully formed me ! Yes, all thy works are wonderful, and my soul delights to acknowledge it. " To thee be rendered praises and thanksgivings ! I am one of the prodigies of thy power, O Creator and Preserver of men ! My body was formed by thy Divine hand, and each of my senses attests thy grandeur. May I glorify thee in all the exercises of the faculties of my body ; whether I breathe, walk, work, or rest ! May I rejoice for ever in thee ; and may my soul be the temple in which thy Holy Spirit shall manifest its presence, and fix its everlasting abode ! " Amen.

The damage occasioned by extraordinary cold.

JANUARY XVI.

THE DAMAGE OCCASIONED BY EXTRAORDINARY COLD.

HOW comes it, that we so readily notice what the laws of nature produce which appears injurious ? that we dwell on and murmur on them, while we pass by so lightly the many striking advantages which they procure for us ? In these cases men act toward God as they are accustomed to do toward their fellow-creatures. The slightest offence, the smallest damage which they receive from their best friend and benefactor, often effaces the remembrance of the most essential services which they have obtained from him. Their ingratitude and pride diminish the worth of the benefits they have received ; and cause them to look upon slight offences as the greatest wrongs. In these times, especially, there is room to make this remark. At present, people seem only attentive to the evil which may result from the cold, without considering the good that the frost produces in the earth ; or, at least, they think of it without any sentiment of gratitude. If they discover the smallest loss ; if some parts of the great *whole* suffer a little ; they believe themselves authorized to murmur against God, without considering, that nature, taken together, derives great advantage from the cold. Let us now impartially weigh the advantages and disadvantages which we derive from this present state of things ; and the result of our researches will convince us how little reason we had to find fault with a wise and gracious Providence.

It is true, that a severe cold brings inconveniencies, and has distressing consequences. Sometimes the water is frozen so very deep as to render the fountains useless : the fish die in the ponds : the rivers are covered with shoals of ice, which sometimes get on shore and make great ravages. Water-mills are stopped, which may soon produce a dearth of bread. Fuel either cannot be gotten, or is extremely dear. Vegetables sustain great damage : the winter grain freezes, if not well covered ; and plants and trees die. Several animals sink under cold or hunger : the health of men often suffers ; and their life is exposed to various dangers.

These are some of the most striking evils which the rigour of the season may produce. But how many winters do we pass over without feeling these ? And even when it happens that a few animals die, or plants perish by the cold, what are these in comparison of the benefits we derive from it ? Let us be more circumspect in the judgment which we form concerning the ways of God. Knowing so little the connexion of the things of this world ; not being able to embrace, in all its extent, the chain of causes and effects ; how can we take upon us to pronounce on what is good or evil in nature ? And would it not be extremely unjust and unreasonable, that a partial evil should lead us to blame the whole ? Let us rather acknowledge our ignorance, and strengthen ourselves in the consolatory persuasion that there is more good than evil in the world ; more subjects for contentment, than there are causes of affliction : and let us also learn, that

The damage occasioned by extraordinary cold.

there are many things which our personal interest causes us to consider as injurious, which contribute to the general good. Reasoning thus, we shall be tranquil in all events : and, whatever our lot may be, we shall not cease to praise our wise and beneficent Creator.

JANUARY XVII.

NATURE'S REST DURING WINTER.

THE days of winter are the days of nature's rest. In the preceding months she has been occupied in accomplishing the designs of God in labouring for the welfare of the creatures. How rich has the spring been in flowers ! How many seeds has it developed ! And what an abundance of fruits has the summer ripened, that we might collect them in autumn ! Each month, each day, we receive some presents from nature. Is there an instant in which she does not either cheer our sight, regale our smell, or flatter our taste ? And how often does she satisfy the whole at once ! Like a good mother, she is busied from the beginning to the end of the year, in providing for her favourites the necessaries, conveniencies, and comforts of life : food, raiment, and delight ; all have been derived from her maternal bosom. For us, she has caused the herbs to bud ; for us, she has loaded the trees with blossoms, leaves, and fruit ; for us, she has covered the fields with corn ; for us, the vine bears its invigorating fruit ; and for us, the whole creation is adorned with a thousand charms. Wearied with so many labours, nature at present reposes ; but it is only to collect new strength, which she will by and by employ for the good of the world. But even this repose which nature enjoys in winter, is a secret activity which silently prepares a new creation. Already the necessary dispositions are made, that the earth, at the close of a few months, may find the children she has lost. Now the corn begins to bud, which by and by shall become our nourishment ; now the fibres of plants begin to be insensibly developed, which shall shortly adorn our gardens and our meadows.

Here also, O beneficent Creator, I adore thy power and wisdom ! The repose of nature is not less interesting to us, nor less worthy of entering into the plan of thy divine providence, than the activity which she manifests during the spring and summer seasons. Thou hast combined the different revolutions of the earth ; thou hast established the most intimate relation between them ; and, with an equal hand, hast distributed labour and rest. It is thou who hast willed that each sun should vary the seasons of nature, in such times and ways as should be most proper for the perfection of the whole. If I have been so foolish as to blame any thing in the government of the world, pardon, O God, my temerity ! I see, and am more and more persuaded, that all the arrangements of thy providence, how contradictory soever they may appear to my feeble reason, are full of wisdom and goodness. Now, that I behold the earth covered with a

 Nature's rest during winter.

mantle of snow which cools it, I wish to meditate on the good which shall result from it : for, could I promise myself either flowers or fruits, if nature did not enjoy some interval of repose ? Could I expect to sing the harvest hymn, if now, under the snow, and under the ice, thou wert not providing for the fertility of the seed ? Yes, Lord, it is thou, who, in granting repose to the earth, enrichest man with a thousand blessings.

And to me also, O my Father, the time of rest will come. A time in which I shall rest from my labours, cares, and tribulations. In wisdom thou hast dispensed to me the time which I should employ for the good of my brethren. By and by the autumn will come : O may I then resemble those fertile trees, which pour into our laps an abundance of fruit ! In the winter of my life, when my head is covered with white hairs, and I am full of days, may my rest be as honourable and beneficial as that of nature in winter ! How happy should I be, if my contemporaries should say, in speaking of me, " That old man had formerly consecrated his best seasons to labours useful to mankind : his life has been active, social, and beneficent. Even now, the repose of his old age is not idle ; for, by his extensive experience, he contributes to the happiness of his family and his friends. At least, he is labouring for the world to come, whose inhabitant he shall quickly be."

Nevertheless, the repose which I promise myself here below, is little else than a preparation for new labours. O how much shall I be delighted with that which awaits me after the tomb, in the bosom of eternity ! There I shall taste a repose which shall never be interrupted. There the recollection of the labours and afflictions which I have surmounted here below, shall fill my heart with inexpressible joy. In the solid hope of this rest which remains for me, I desire to apply myself with zeal, to accomplish the duties to which I am called ; and consecrate my talents and my strength to the glory of God, and the good of my fellow-creatures. Strengthen me by thy grace in this resolution, my God and my Saviour !

 JANUARY XVIII.

THE LAPLANDERS.

I WISH to begin this meditation with a lively sense of gratitude to my Creator, and pity towards that portion of my fellow-creatures, to whom nature seems to have distributed her bounty with a sparing hand. At present I shall fix my attention on the *Laplanders*, and those who dwell in the neighbourhood of the arctic circle : mortals, whose lot and mode of life are not the most happy, if compared to ours. Their country is formed of a range of mountains, covered with snow and ice, which melt not even in summer : and where the chain of mountains is broken, vast sloughs and marshes are found. A deep snow also covers the vallies and hills : and winter is felt during

The Laplanders.

the greatest part of the year. The nights are long, and the days have but a feeble light. The inhabitants seek shelter from the cold in tents, which they can transport from place to place. In the centre of these they have their fire-place, which they encompass with stones ; and the smoke escapes by an opening which serves the double purpose of chimney and window. From this place, chains of iron are suspended, on which they hang the pots in which they boil their victuals, and melt the ice which serves them for drink. The interior of their tents is lined with furs, which keep out the wind : and they sleep on the skins of animals spread on the ground. In such habitations as these, they spend the winter. For six months of the year they have a perpetual night, during which, they only hear the whistling of the winds, and the roaring of wolves, who are howling about on all sides for their prey.

How could we endure the climate and mode of life of these people ? How much should we think ourselves to be pitied, had we nothing before our eyes but an immense extent of ice, and of deserts, covered with snow, while the absence of the sun rendered the cold still more insupportable ? And if, instead of a commodious dwelling, we had nothing but a portable tent formed of skins stretched out upon poles ; if, to provide for our subsistence, we had no other resource than that of long and dangerous hunting ; and if, at the same time, we were deprived of the pleasures which the arts, and of the charms which social and commercial life procure us ?

Should not these considerations cause us to fix our attention on the many prerogatives which are attached to our climate, to which, in general, we pay so little attention ? Should they not lead us to bless that Divine Providence, which has freed us from so many inconveniencies and hardships ; and which has distinguished us with a thousand advantages ? Yes, we should bless that Divine Providence ; and when we feel the rigour of this season, we should give thanks to God that the cold is so moderate in the place where we dwell ; and that we have received so many means to preserve ourselves from it. Let us also bless the mighty Arbitrator of the universe, that, in the midst of that devastation, the image of which the winter presents us, he has given us the cheering prospect of the returning spring, the bare idea of which can comfort and support us in the present evil.

But is the inhabitant of these northern climes so unhappy as we suppose him to be ? It is true, indeed, that he wanders painfully through vallies, and uncleared ways ; and that he is exposed to the inclemency of the weather ; but his hardy body is capable of bearing this fatigue. The Laplander, it is true, is poor, and destitute of all the comforts of life ; but, on the other hand, is he not rich, as he feels no other wants than those which he can easily satisfy ? He is deprived, during several months, of the brightness of the sun ; but to render his dark nights supportable, the *moon* and the *Aurora Borealis* shine bright on his horizon. Even the snow and ice, under which he is buried, do not render him miserable : for education and habit have armed him against the rigours of his climate. The hardy life

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which he leads, has taught him to brave the cold ; and as to those particular helps which are indispensably necessary, nature has rendered the use of them easy to him. She points out to him the animals whose fur is a safeguard against the asperity of the season : she has given him the rein-deer, which furnishes him at once with his tent, clothing, bed, meat, and drink ; with which he risks the longest journeys ; which, in a word, supplies almost all his necessities, and whose maintenance is scarcely any expense.

If, in the midst of the miseries of their situation, these poor creatures had a more perfect acquaintance with God, such a knowledge as revelation has given us ; if, less savage and less indifferent, they knew how to derive from friendship those charms which embellish life ; if, I say, it were possible for them to unite these advantages with that tranquillity of mind which is their characteristic ; these miserable people, whose mode of life terrifies our depraved imagination, would not be so much to be pitied as we suppose. And if it be true, that the idea we form of felicity is more the business of opinion than of reason ; if it be true, that real happiness is not the exclusive privilege of certain people, and certain climates ; and that, with the mere necessities of life, and peace of mind, a man may be happy in any corner of the world ; we have a right then to ask the question, What does a Laplander want to make him happy ?

JANUARY XIX.

THE WISE CONSTRUCTION OF OUR GLOBE.

HOWEVER limited the human mind may be ; however incapable of laying the ground-work, or of conceiving the entire plan which the Creator has executed in forming our globe ; we may, notwithstanding, through the medium of our senses, and by making a proper use of that reason with which we are endued, discover enough to lead us to acknowledge and admire the divine wisdom. To be convinced of this, we have only to reflect on the form of the earth. It is well known, that it resembles a ball : and why has the Creator chosen this form ? To the end that every point of its surface might be inhabited. This end could not have been attained, had not the inhabitants of the earth found every where a sufficient degree of light and heat ; if the water could not have diffused itself every where ; and if the wind could not have blown in all directions, without any material obstacle. The earth could not have had a more proper figure to secure these advantages, than that which it has. Because of its globular form, light and heat, those two things so necessary to life, are easily distributed over the earth. Had it not had this form, the revolution of day and night, the changes in the temperature of the air, cold and heat, dryness and moisture, could not have taken place. If the earth had been square, conical, hexagonal, or in any other angular form ; what would have been the result ? Why, one part, and that the greatest,

Construction of our globe.

must have been drowned, while the other languished in drought. Some countries must have been deprived of that salutary agitation which the winds produce ; whilst others would be reduced to desolation by perpetual tempests.

If we consider the immense bulk of our globe, we shall have fresh reason to admire the supreme wisdom. If the earth were more soft or spongy than it is, men and other animals must have been buried in it. If it were harder, more compact, and less penetrable, it could not be tilled ; nor would it be capable of producing and nourishing that multitude of plants, herbs, roots, and flowers, which are now fostered in its bosom. Our globe is formed of distinct and regular beds : some of different kinds of stones, others of different metals and minerals. The numerous advantages which result from this, especially to mankind, are evident to every person. Whence could come that fresh water, so necessary to the wants of life, if it had not been purified and filtered through the beds of sand which are discoverable at a great depth in the earth ? The surface of our globe presents a variegated aspect, an admirable assemblage of plains and vallies, of hills and mountains. From this we may clearly perceive the wise designs which the Author of nature has formed in thus diversifying the surface of the earth. How much of its beauty would the earth have lost, had it been one uniform plain ! Besides, how much more favourable to the health of animals is this variety of mountains and vallies ; how much more convenient for the habitation of different species of birds and beasts ; and how much better calculated to produce all the varieties of plants and vegetables ? If there had been no mountains, the earth would have been more thinly inhabited by men and animals ; we should have had fewer plants, fewer simples, fewer trees ; and we should have been totally deprived of metals and minerals ; vapours could not be condensed, and we could neither have fountains nor rivers.

Who cannot but acknowledge, that the whole plan of the earth, its figure, its external and internal construction, all are regulated by the wisest laws, and conspire to promote the comfort and happiness of the animal creation ? Supreme Author of nature ! thou hast ordered every thing in the earth with wisdom. Withersoever I turn my eyes, whether I examine the surface, or penetrate the interior structure of that globe on which thou hast fixed my abode, I discover every where the impress of the most profound wisdom, and of a goodness without bounds. How beautiful is this dwelling place ! How well suited to the necessities of the creatures which reside in it ! Nevertheless, I shall dwell in it but a short time, and can discover but a small part of it : but how shall I exult at the thought of that new earth, of which I shall one day be an inhabitant ! There I shall be able more successfully to contemplate the marvellous works of my Creator ! And, how great shall be the beauty, how great the treasures, of that new habitation, seeing this, on which I am only destined to sojourn for a little, is so full of pleasures, so rich in blessings !

JANUARY XX.

SHORT MEDITATIONS ON THE WORKS OF GOD, TAKEN CHIEFLY FROM THE SACRED WRITINGS.

HEARKEN to this, stand still, and consider the wonderful works of God! *Job xxxvii. 14.*

Jehovah hath formed the earth by his power; he hath established the habitable world by his wisdom; and hath stretched out the heavens by his understanding. *Jer. x. 12.*

And God said, Let there be light; and there was light: and God saw the light, that it was good: and God separated the light from the darkness, and he called the light Day, and the darkness he called Night. *Gen. i. 3, 4, 5,*

Thou art the Lord who hast made the heavens, and the heaven of heavens, with all their hosts; the earth, and all that is in it; the seas, and all that is therein; thou givest life to all things; and the hosts of heaven worship thee. *Neh. ix. 6.*

O Lord my God, thou art marvellously great; thou art clothed with honour and majesty! Who coverest thyself with light, as with a garment; who stretchest out the heavens like a curtain; the Lord layeth the beams of his chambers in the waters: He maketh the clouds his chariot: He walketh upon the wings of the wind. He maketh the winds his messengers, and the lightnings his agents. He hath laid the foundations of the earth, so that they cannot be shaken. Thou hast covered it with the deep as with a garment; the waters pass over the tops of the mountains. *Psal. civ. 1—7.*

He hath stretched out the heavens over the chaos, and hath hung the earth upon nothing: He bindeth up the waters in the clouds, that they may not all fall at once upon the earth. His power raiseth the waves of the sea; and his wisdom restraineth their fury. *Job xxvi. 7, 8, 12.*

He raiseth the vapours, and assembleth them in clouds which drop down in rain upon the face of the earth. He is not less wonderful when he covers the heavens with thick clouds; and when the thunder and lightning proceed from his tabernacle. He spreadeth his lightnings over the clouds, where all the waters of the sea seem to be heaped together. Thence, as from his throne, he at one time exerciseth judgment over the nations; and at another, scattereth abundance over the earth with a liberal hand. *Job xxxvi. 27. &c.*

The thunder rumbles, and the stroke is already struck ere we see the lightning; thus the strong God announceth his wonders, and doth great things which we cannot comprehend. When he saith to the rain of winter, Fall down upon the earth; it inundates the fields. Tempests come from the south, veiled with thick clouds; and cold is brought to us by the north winds. By the breath of the mighty God ice is produced; and the waters, which were spread on all sides, are held in chains. He causeth the most clear and serene sky to suc-

ceed to that which was most obscured ; and his light takes place on the clouds. He who holds the reins of the world, collects these meteors, that they may fulfil the task which he hath appointed them on the face of the earth ; whether he intends that they should punish men, or manifest the effects of his bounty. *Job xxxvii. 5, &c.*

God is most wise, and most mighty : who hath opposed him without bearing the punishment of his temerity ? He snatched up the mountains, and overturneth them with the breath of his nostrils. He causeth the earth to tremble from its foundations, insomuch that its pillars are shaken. He forbiddeth the sun to arise, and that luminary showeth not itself : and he sealeth up the stars. He spreadeth out the heavens alone, and walketh upon the waves of the sea. He hath formed the pole star, the constellations which bring the hoarfrost, those which produce heat, and those which are always hidden in the opposite hemisphere. He doth great things, past finding out ; and wonders without number. *Job ix. 4, &c.*

Thou hast opened the fountain and the torrent ; thou hast dried up mighty rivers. The day is thine, and the night also is thine : thou hast prepared the light and the sun. Thou hast fixed the limits of the earth ; thou hast regulated the summer and the winter seasons ! *Psalms lxxiv. 15, &c.*

He raiseth up the east wind in the air ; and he bringeth forth the south wind by his power. *Psalms lxxviii. 26.*

He watereth the mountains from that great collection of waters which he holds suspended over our heads ; and he filleth the earth with the fruits which he causeth it to produce. He causeth provender to spring up for the cattle ; and raiseth up corn for the service of man ; thus making bread to proceed from the earth. *Psalms civ. 13, 14.*

He giveth to the beasts their proper food : and to the young ravens that which they demand by their cry. All the animals turn their eyes towards thee, and thou givest them their meat in due season. *Psalms cxlvi. 9. cxlv. 16.*

Thus saith the Lord, thy Redeemer, and he who hath formed thee, I am Jehovah, who have made all things, who have stretched out the heavens alone, and spread abroad the earth by myself. *Isaiah xlv. 24.*

For, thus saith the Lord, who hath created the heavens, God himself, who formed the earth, and made and established it : He hath not created it that it should be empty ; but he formed it that it might be inhabited. I am Jehovah, and there is none other. *Isaiah xlv. 18.*

Remember the former things, which have been of old ; I am the strong God, and there is none else ; there is nothing like unto me ; I form light, and create darkness ; I give peace, and create adversity ; I am Jehovah, who hath made the universe. *Isaiah lxvi. 9. xlv. 7.*

JANUARY XXI.

THE WONDERS OF THE HUMAN VOICE.

THE human voice is one of the master-pieces of the Creator's work. Whether it be considered in its principle, its variations, or its organs, it is impossible to fathom its admirable mechanism. Let us endeavour at present to reflect on it in silence. What is it that enables us to emit sounds? This property belongs to the windpipe; the little opening which is found in it causes a sound, when the air which we breathe is driven smartly through it. The windpipe is composed of annular cartilages, which are fastened together by an elastic membrane. At its entrance, there is a small covering, or valve, which gives passage to the air when it goes out of its canal. It opens itself, less or more, to modify or multiply the tones of the voice; and when we swallow any thing, it shuts down to hinder the food (which must go over it into the stomach) from entering the windpipe. Experience has taught us, that there are twelve full tones in the human voice. To produce this variety, it was necessary the windpipe should be divided into twelve equal parts: and as its two sides, when it is stretched, are distant from each other about the tenth part of an inch, we may thence calculate, that each tone of the voice may be subdivided into one hundred others; and that a man may produce 2400 different tones of the voice, which may all be distinguished by the ear.

Nevertheless, with respect to these properties, which are very surprising, we have very few advantages over other animals. But the prerogative of man consists in this, that he can compress the air, and modify his voice, so as to pronounce letters and words. The palate, the teeth, and the lips, contribute their part to this operation. Let us consider the manner in which we pronounce the five vowels, which have each but a simple sound. When we pronounce the letter *A*, the sound is quite different from that of the letters *E*, *I*, *O*, *U*, though each be pronounced on the same key. The reason of this difference is among the number of the impenetrable mysteries of nature. In order to pronounce these vowels, the mouth must be less or more opened; on this account, man is formed differently from all other animals. Even some birds, which learn to imitate the human voice, are never able to pronounce the five vowels distinctly. Hence this imitation is very imperfect. As to the pronunciation of the consonants, three of our organs principally contribute to it; the lips, the tongue, and the palate. The nose also contributes to this: let a man stop it, and he shall find that there are certain letters which he cannot pronounce, except in a very imperfect manner. One thing which sufficiently proves that the organization which renders us capable of pronouncing words, and is infinitely marvellous, is, that human art has not been able to imitate it by any machine. It is true, we have imitated singing; but not the articulation of sounds, and the pronounci-

ation of different vowels. In several of those instruments termed organs, there is an *air* called the *human voice* : but it produces no other sounds than those which resemble the diphthongs *ai*, or *ae*. And all the efforts of our art have not been able to imitate one of those words which we so easily pronounce.

Let these considerations excite us anew to reflect on, and celebrate, the ineffable wisdom and great goodness which God manifests in the construction of every part of our body. And may these reflections lead us to estimate properly the worth of speech, by which we are so advantageously distinguished from other animals ! How gloomy would human society be, and how diminished would the comfort be which we derive from it, if we had not the faculty of communicating our thoughts by speech ; and if we could not unburthen our hearts in the bosom of a friend ! How deplorable would our lot be, if we were in the number of those unfortunate persons, who, from their infancy, have been deprived of the use of speech ! Are there not several of these unhappy people among us ? Let us learn from them, as often as we see them, to esteem our happiness ; and to render thanks to the Lord, that, among the multitude of benefits with which he has blessed us, we have the gift of speech. Let us make a salutary use of it ; let us employ it to glorify the Supreme Being ; and to edify, comfort, and instruct our brethren.

JANUARY XXII.

THE DUTY OF SELF-EDIFICATION IN WINTER.

I ADDRESS myself to you who seek, with a laudible solicitude, to get edification from every occurrence. I wish to recall to your memory the obligation you are under to employ even the winter in this way, to the end that its days may prove times of happiness to your souls. And I wish to show you how pleasing and advantageous the practice of this duty may be to you.

How much would your piety be strengthened, if, at each change, each new aspect of nature, you would endeavour to mount up to that God whose glory is manifested in winter, as well as in other seasons ! If you see the earth covered with snow, the rivers frozen up, the trees stript of their leaves, and all nature empty and barren, think on the reasons which induce the Creator to suffer it to be so. With a little attention, you will at least discover, that all is regulated by wisdom ; and that all the laws of Providence tend to the general good of the creation. And if, because of your limited understanding, you can only comprehend a small part of the designs of God, it will be sufficient to show you, that the snow and the ice, and all the phenomena which the winter presents, concur in the plan of the Supreme Wisdom to fertilize the earth, and to prepare it for the comfort of those who dwell thereon.

The duty of self-edification in winter.

You will meet with innumerable objects which will give you room to make edifying reflections. You see in how short a time the snow is dissipated, and the ice melted; and with what rapidity the days pass away! Is not all this proper to cause us to remember the frailty of life? You dwell in a warm chamber, and you have every thing that is necessary for your comfort; should not these various comforts cause you to think on your poor brethren, who are destitute of fuel, clothing, and bread? You observe how short the space is between day and night; should not this naturally lead you to meditate on the shortness of life, and give you to feel how necessary it is for you to redeem the time, and to profit by every hour you enjoy? You see with what imprudence many persons expose themselves upon the ice; does not this represent to you the carelessness and levity of those mortals who abandon their souls to the pleasures of this life? and how many other objects, in this season, may furnish you with matter for similar reflections, which may have a salutary effect on the mind? And if you seek not only to occupy your understanding, but to mend your heart, each of these objects may answer the end. And each good thought, each pious resolution, each pleasing image, which these objects have awakened in your soul, will be to you a subject of thanksgiving.

“Imitate the bee; follow thy taste, and choose the most beautiful flower: to the pious soul, the most barren field is rich in sweets.”* I can promise you the greatest advantages in such a use of your time. By this, your heart will learn to govern its distractions, and to triumph over its sensuality. You will not need to have recourse to turbulent pleasures, to deliver you from the martyrdom of weariness. When others go to seek diversion in plays, feasts, and worldly shows; you will find, in contemplating the works of God, whether in solitude, or in the chosen circle of pious friends, more noble and durable delight. Nothing can produce a more durable and exalted pleasure, than to lift up your head above worldly objects; and to imitate that which constitutes the occupation of angels, and the spirits of just men, in the kingdom of God. What ecstatic joy, to be able to find God every where! To discover, in the flake of snow, as well as in the flower of spring; in the cold of winter, as well as in the heat of summer, the goodness and wisdom of the Almighty Creator. And this joy, which a thousand, thousand times surpasses all terrestrial pleasures, thou shalt experience, if thou endeavour habitually to edify thyself by every occurrence.

O Divine Spirit, may thy powerful influence come to the assistance of my feeble heart! I wish to raise myself up wholly to thee: but thou knowest the world often holds me in chains, and prevents my soul from soaring up to heaven. Deliver me from the bonds which attach me to vain honours and empty pleasures! And may my soul arise more and more towards thee! How edifying shall my death one

* A German tetrastick.

The duty of self-edification in winter.

day be, if my life shall have been employed in so pious and exemplary a manner! O what reason shall I have to triumph in thee, when, raised to thy celestial abode, I may increase eternally in knowledge by the contemplation of thy marvellous works; discover and admire thy wisdom, no longer attracted by little objects; and derive, from the meditation of the most sublime things, new motives to exalt and glorify thy holy name!

JANUARY XXIII.

THE FEAR OF APPARITIONS.

THE long winter nights are terrific to many persons; because they are then tormented with the ridiculous apprehensions of spectres. This superstitious fear was more excusable in the time of our ancestors; because people had not, at that time, a clear idea of the nature of spirits; and religion was brought in to favour this superstition. But we may well be astonished, that in an age so enlightened as ours, such ideas, and such fears, should have place. However, this shows how ingenious man is to forge monsters to torment himself. It is not enough that real evils afflict us from time to time; but we create imaginary evils, and become miserable because we believe we are so.

How wretched is the miser, through his fear of thieves; the misanthrope, through his distrust of all around him; and the discontented person, through the inquietudes which he feels concerning the future! From these things let us learn to know the nature of the human heart; and the necessity of watching over our own imagination. If our imagination deceive us during the night, in presenting terrific phantoms to our view; it oftener produces these illusions by day, in representing vice under attracting images. How happy would it be, were we as ready to fly from all solicitations to sin, as we are to fly from an apparition! But in the first case, man is bold and rash; in the latter, timid and faint-hearted.

But whence comes this chimerical fear which seizes on so many persons, whom more terrifying circumstances would leave secure and unmoved? The fear of only one person returning from the dead, causes us to start; while the certainty of being one day transported to the world of incorporeal beings, makes no impression on our minds. Besides, although at every step we know that we approach the presence of the Infinite and Eternal Spirit, we feel no sensation of fear on this head. If a dead man should appear to us at midnight, and declare that we should shortly go and join him; the most intrepid man would be frozen with terror; would make serious reflections on the event, and expect the issue with great uneasiness. But why are we so inattentive to the voice of our Maker, which incessantly cries to us, *Prepare to meet thy God*? How foolish are we, to continue in security, while it would be wise to fear; and to groan, when there is nothing to be dreaded!

The fear of apparitions.

My soul, abandon not thyself to vain nocturnal terrors ; but fear that Supreme Being, whose coming shall appal the heart of the most intrepid hero, so that, in his anguish, he will call upon the mountains to fall upon him, and to the hills to cover him. Above all things, fear to offend God ; dread the wrath of the Holy One of Israel : then thou mayest banish every other fear, and cry out, with David, *The Lord is my light, whom shall I fear ? The Lord is the strength of my heart, of whom should I be afraid ?*

JANUARY XXIV.

SUBTERRANEAN FIRES.

IN digging a little downward in the earth, we find a greater degree of cold than at the surface ; because the surface is penetrated by the rays of the sun. Hence it is, that the inhabitants of warm countries may preserve ice through the whole year to cool their drink. But, if we dig down 50 or 60 feet lower, we find the heat sensibly to increase ; and if we descend to a much greater depth, the heat becomes so great as to stop respiration, and extinguish the wick of a lamp. It is not easy to determine the cause of this heat. Those who maintain that it proceeds from subterranean fire, come, probably, nearest to the truth. But, how can this fire burn, which is so closely shut up ? What is the fuel that supports it ? How is it kept from consuming every thing about it ? These are questions which cannot be easily answered.

There are phenomena on our globe that strongly prove the existence of subterranean fires. Terrible eruptions of inflammable matter, take place from time to time. The two best known mountains which produce these are, *Etna*, in *Sicily*, and *Vesuvius*, in the kingdom of *Naples* : the accounts which are given of these two volcanos, are terrible. Sometimes a black vapour only is seen to issue out ; at other times, a hollow bellowing is heard : these are immediately followed with thunder and lightning, accompanied with an earthquake. Then the vapour brightens, and becomes luminous ; stones are ejected with a great noise, and fall back again into the gulf, whence they were vomited. Sometimes these eruptions are so violent, that great pieces of rocks are darted up into the air, and turn there with the rapidity of a foot-ball ; and the force by which they are ejected is so great, that in the last century, pieces of rocks 300 pounds weight, were thrown up into the air, and fell at the distance of three miles !

However, even these eruptions are not the most dangerous ; for, at certain times, the vitrified entrails of the earth boil up, and rise, so that their formidable scum is poured out, and runs for miles over the adjacent fields, and overwhelms every thing that it meets with in its passage. This torrent of fire endures for some days ; and one wave rolls after another, till they have reached the sea ; and even here its

Subterraneous fires.

violence is such, that it continues to run on for some time, without being quenched in the waters of the ocean! Who can think without terror, on the devastations occasioned by such eruptions! Towns and villages, with their fertile plantations, are entirely swallowed up; the crops are consumed; and the fields, olives, and vines, entirely destroyed. In one eruption of Etna, we are informed that the torrent of burning lava buried fourteen towns and cities, and that the rumbling of the mountain was heard at twenty miles distance.

But of what use are these volcanos, which scatter so much terror and devastation over the earth? Why has the Lord created them? Whence does it come, that instead of bridling their fury, he permits them thus to destroy his creatures?—But, what am I, who dare to ask such questions? Have I a right to call Supreme Wisdom to an account for the arrangement it has made? The existence of these volcanos, however, cannot have been the work of chance; and I ought to conclude from this, that the Creator has had the wisest reasons for willing the existence of such upon the earth. Further, even here, I again find the beneficent hand which provides for the welfare of this world.

Whatever ravages the eruptions of these mountains cause, they are nothing in comparison of the advantages which they procure to the earth in general. The inward parts of the earth being filled with fire, volcanos are indispensably necessary: they are the air-vents, by means of which the action of this formidable element is interrupted and weakened. And although the countries where these subterraneous fires are found in greatest numbers, be subject to earthquakes, they would suffer more violent ones, if these mountains did not exist. Italy would not be the most fertile of countries, if the fire, which has its storehouse in the bowels of the earth, did not, from time to time, issue out at these volcanos. And after all, who knows but various other advantages, hidden from our eyes, may result from these frightful phenomena, the influence of which may extend over the whole globe. At least, this suffices to convince me, that they concur to accomplish the wise and beneficent designs of our Divine Author. And if there be found here matters which are obscure and inscrutable, let us put our hand upon our mouth, and say, Lord, thy judgments are just and true; and thy ways impossible to be found out. O God of majesty, who dost such terrible things upon the earth, who would not fear THEE!

 JANUARY XXV.

OF COMETS.

THAT extraordinary star, which borrows its name from the vapour by which it is surrounded, is, certainly, one of the heavenly bodies which appertain to our system. It has its revolution round the sun,

Of comets.

as well as our planets : but it differs from all the rest by its peculiar motion, its orbit, and its figure. Seen through a telescope, it appears full of spots and inequalities ; but often the thick vapour which surrounds it prevents it from being distinctly perceived. The magnitude of comets is subject to many variations. Some scarcely equal stars of the third or fourth magnitude ; while others surpass those of the first. In the centre of this appearance we discover a very thick nucleus, which sometimes divides, and then resembles the edge of the disk. Its figure is not always perfectly round ; nor has its light always the same degree of brightness and strength. Its tail is always in an opposite direction to the sun, and is so thin and transparent, that we can see the fixed stars through it. This tail sometimes extends from the horizon to the zenith, and gives to the whole of this body an awful aspect. The further the tail extends from the comet, the broader it grows. Sometimes it divides its tail into different reflections and rays.

What we have said, is a part of the result of those exact observations made by astronomers. But, doubtless, it is the least important part of what we should know, in order to acquire a perfect understanding of all things relative to these celestial bodies, many of which are out of the reach of our sight. Is a comet an aqueous planet, or a burning globe ? This cannot be certainly determined : nor can a satisfactory answer be given to the following questions :—Can such a globe be inhabited, which sometimes, in the vicinity of the sun, experiences so much heat ; and at other times, passing far beyond the orbits of the other planets, is immersed in the thickest darkness, where, probably, even the rays of the sun have no influence ? Has the Judge of the earth destined such for the chastisement of his creatures ? Are their gross surface (exposed, at different times, to violent degrees of heat and cold) the abode of disobedient beings, whom God has consigned to punishment ? Shall these errattick bodies become one day the cause of turning the planets from their orbits, and thus effecting their destruction ? Or, are they still deserts, without form and void, as the earth was before the Creator rendered it habitable and fruitful ? And shall not these comets accomplish their destination till the earth be no more ? And as it is utterly impossible for us to solve these questions, we should be convinced, that human knowledge is very limited.

Men often lose sight of this truth. Were it present to their hearts, the appearance of a comet would not beget in their minds such a multitude of vain conjectures, which so ill accord with our limited understanding. Many consider a comet as the forerunner of Heaven's judgments. Some read in it the destiny of nations, and the fall of empires. To others, it is a presage of wars, plagues, inundations ; in a word, of the most formidable scourges. These superstitious persons do not consider, that a comet is a natural body, the return of which can be calculated with certainty, and which, consequently, cannot disturb the order of things. They do not consider that this body, as

well as the other planets, must have a more important destination than that which superstition gives it. What! would the Supreme Wisdom have placed such prodigious bodies in the heavens merely to announce to a few creatures the fate which awaits them?

May the comet, after having travelled over the immense distance which hides it from our sight, be to me, on its return, not a messenger of misery, but a herald of the majesty of the Most High! I wish to adore that Supreme Being, who has prescribed to it its course, who has conducted it through the immeasurable depths of ether, and who has ordered it sometimes to approach the sun, and at others to withdraw from it to the utmost limits of the planetary system. As often as it shall blaze above my head, may my soul, by an effort of piety, spring upwards towards that Being who is the Arbiter and Sovereign of worlds! May I dwell on that sublime thought, that, by and by, I shall rank in the number of the inhabitants of that eternal abode, where, traversing the immense expanse of heaven, I shall discover millions of new worlds, without the assistance of telescopes!

JANUARY XXVI.

THE FORMATION OF SNOW.

ON seeing the title of this meditation, some of my readers may be ready to exclaim, is it worth while to examine so common a phenomenon of nature? However, my design is, to fix their attention on this wonder, and to show them, in the formation of snow, a spectacle which has charms sufficient to delight a mind that is fond of reflection.

Snow consists of watery particles frozen in the air: frozen water becomes ice; and snow only differs from ice in this, that the water which constitutes ice has been frozen when in its ordinary density; and the water which forms snow has been frozen when its particles were separated, and reduced in the state of vapour. Experiments have been made, which prove that snow is twenty-four times more rare than water; and that it occupies ten or twelve times more space the moment that it falls, than the water does to which it is reduced when melted, which could not take place, were not snow-water extremely rarefied. But snow is not water simply; for the structure of its parts, and the effects which it produces, are different from those of water and ice. And, in this respect, the manner in which snow is formed has something very remarkable in it. When the particles of the vapour assembled in the atmosphere, freeze, the nitre, which is every where dispersed through the air, unites itself to them in the form of hexagonal darts. While a great number of similar little darts meet together, the particles of water which were between them harden, and assume the form of the nitre. Hence those six-sided flakes, which are composed of points like fine small needles, to each side of which, darts, or filaments still smaller, attach themselves, the form of which often changes by being carried hither and thither by the wind.

The formation of snow.

How wonderful would these flakes of snow appear to us, if we were not accustomed to see them every year! But, should we neglect to attend certain wonders, for this simple reason, that they are frequently reproduced? No; let us be so much the more diligent to examine and admire the wisdom of God in them; who, in every season, shows himself so rich and inexhaustible in the means which he uses to provide for the wants and comforts of mortals.

Has any one reason to complain that the winter does not afford a variety of recreations, both for the senses, and for the understanding? Is it not an astonishing sight, to see how nature has formed these flakes of snow with the most exact symmetry? To see them fall from the air in such prodigious numbers, and to observe the different forms which water assumes under the creating hand of God? Sometimes it forms itself into hail, sometimes it hardens itself into ice, and sometimes into hoarfrost, and snow-flakes innumerable! All these changes tend at once to the use and embellishment of the earth, and prove that God shows himself great, and worthy of our adoration, in the smallest phenomena of nature.

Let us no longer regard the snow with an indifferent eye: its formation, and the advantages which result from it, should lead us to thee, O Lord, who hast produced it, and scattered it over the face of the earth. "To thee, O God, who lovest all nature, who sendest forth thy snow like wool; who scatterest thy hoarfrost like ashes; and who commandest thy cold to bless and fertilize the earth, to thee be rendered praise, honour, and glory, for ever! Amen.

JANUARY XXVII.

THE RAPIDITY WITH WHICH HUMAN LIFE PASSES AWAY.

OUR life is brittle and transitory. This is an incontestable proposition; although, to judge by the conduct of man, we should not think it was found in the number of received truths. I call the reader to his own experience: should not every step you have taken in the course of your life, from your birth to the present moment, have convinced you of its transitory nature.

Only consider, with what swiftness the days, weeks, months, and years, have passed, or rather, flown away! They were past and gone, before you had time to perceive them. Endeavour to recall them to your memory, and to follow them in their rapid flight. Is it possible for you to detail all their epochs? And if there had not been certain remarkable moments in your life, which are engraven on your memory, you could not have recollected the history of them. How many years of your infancy have been consecrated to childish amusements, and of which you can say nothing more than, *they are passed away!* How many others have glided away in the carelessness of youth, during which, led astray by your passions, and given up to pleasure,

The rapidity with which human life passes away.

you had neither will nor power to reflect upon yourself! To these years have succeeded those of riper age, in which you were more susceptible of reflection. You thought then, that it was time to change your course of life, and to act as a reasonable being; but the affairs of life occupied you to such a degree, that they left you no leisure to reflect on your past years. Your family increased; and your cares and efforts to provide for their wants were accumulated in proportion. Old age insensibly steals on; and, perhaps, then you will neither feel leisure nor power to recall the past, to reflect on the term at which you have arrived; and on that which you have done, or neglected to do: in a word, to consider seriously the end for which God has placed you in this world. But who has promised that you shall attain to this advanced age? A thousand accidents may break the brittle thread of life before it has attained its average length. The infant, who is just born into the world, dies, and is reduced to dust: the young man, who gave the most promising hopes, is cut down in the time of grace and beauty; a violent disease, an unforeseen accident, has laid him in the tomb. Dangers and accidents multiply with time: negligence and excess produce the germs of disease, and dispose the body to receive the attacks of those which are epidemic. The latter age is still more dangerous: in a word, one half of those which are born into the world are soon taken away from it, and perish within the short space of their first *seventeen* years.

Behold, O man, an epitomized, but faithful, history of life! O that you may employ it to acquire that wisdom by which you shall be able to number your days, those days which are so short and important; and to redeem that time which flies away with so much rapidity! Since you have begun to read, several minutes have elapsed: what a precious treasure of hours and days might you not amass, if, of that number of minutes which are yet at your disposal, you would often consecrate some to purposes so wise and useful! Think seriously of this: every instant is a portion of life, which it is impossible to reproduce; and the remembrance of which will be to you a source of joy or grief.

What a celestial happiness, to be able to reflect on the past, and say to yourself, with truth, "I have lived so many years, during which I have been employed in sowing the seeds of holy works: I do not wish to begin my days afresh; and I regret not that they are passed away." You will be able to make use of this language, if you live for the accomplishment of that end for which life has been given to you; if you consecrate your short space of time to the great interests of eternity.

Of that species of hoarfrost seen on windows.

JANUARY XXVIII.

OF THAT SPECIES OF HOARFROST SEEN ON WINDOWS.

THIS little phenomenon shows us how much simplicity, variety, and order, nature puts in her smallest productions. We often admire the extraordinary figures which frozen glass presents to us ; but it seldom happens that we consider them with that attention which the subject requires, however unimportant it may appear in itself. This phenomenon in question has its principle in the fluidity of fire. When it is shut up in the warm air of a chamber, it seeks to diffuse itself on all sides, and to penetrate where it finds matter the least homogeneous to itself. Hence it is that it glides through the very close texture of glass, which contains neither air nor heat. In passing through the glass, it leaves on the inside, and at the entrance of the apertures, those portions of air and water to which it was united ; it forms a cloud, which thickens, as the fire passes out, till there remains too little in the chamber to hold the thick particles of water on the glass in a state of fluidity. Then they congeal, and the nitre which was in the air uniting with them, causes them to produce that diversity of appearances with which we see the windows covered.

The commencement, or first sketch of these figures, is formed by very small filaments of ice, which insensibly unite, because the glass is covered with an icy crust. These filaments are the origin of all these figures ; but we may still distinctly discover the texture of all the filaments. We at first see lines extremely fine, from which others still proceed, nearly resembling the filaments which grow from a quill, which in their turn produce other branches. When it freezes much, and the first crust of ice is thickened, the most beautiful flowers, and lines of all kinds, sometimes straight, sometimes spiral, are the result. There is reason to believe, that this great diversity of figures does not proceed merely from the motion of the air, and particles of fire, but also from the small imperceptible clefts or tracks which are in the glass. Whatever the reason of this phenomenon may be, it is certain that this *sport of nature* shows a great deal of art united with much simplicity.

Probably the reader may find what is said on this subject too minute, as the subject itself is of no other worth than merely to divert the sight for a little. But such a subject as this, in my judgment, has great advantages over those which often engage our attention. With how many trifling subjects do we amuse ourselves, both in private and in company ! Certain phenomena of nature, which we treat as trifles, may be highly worth both speaking and meditating on. Such researches are very pleasing to a mind which is earnestly desirous to get information, even from the smallest objects. Let us lay aside prejudice, and those puerile ideas which we have formed of works of nature, and we shall think otherwise. We often see that masterpieces have been discovered where ignorance could perceive nothing

Of that species of hoarfrost seen on windows.

but trifles ; for nature manifests her wisdom even in the smallest works ; and it is in this respect that we distinguish her works always from those of art.

Can an object be considered as little, when it furnishes matter for useful reflections ? For my own part, I do not disdain to read, even on the frozen glass, a truth which may have a great influence upon my happiness. Behold the flowers which the frost has pourtrayed on the glass ! they are beautifully and artificially varied ; nevertheless, one ray of noon-day sun effaces them. Thus the imagination paints every thing beautiful to us ; but every thing which it represents as attractive, in the possession of the goods of this world, is but a beautiful image, which shall disappear in the light of reason. The importance of this lesson of wisdom was worth the trouble of stopping for a while at the little phenomenon which furnishes it.

JANUARY XXIX.

THE UTILITY OF BREAD.

OF all the aliments which our beneficent Creator has distributed to us with so much profusion, there is none so common or so nourishing as *bread*. It is as necessary at the table of the prince as at that of the labourer ; and the invalid is strengthened by the use of it as well as the healthy. It seems particularly destined for the use of man ; for the plant which produces it will grow in different climates ; and it would be difficult to find a place in the habitable world where *wheat* would not grow and ripen, if cultivated with proper care. A very evident proof that man cannot dispense with the use of bread, is, that it is the only aliment of which we may continually eat without being cloyed. All those far-fetched and costly viands, which luxury and pride have invented, soon cease to flatter our taste, if we use them too frequently : but we eat bread always with pleasure, and the old man, whose nourishment it has been for threescore and ten years, eats willingly of it still, when, to him, all other aliments have lost their savour.

It is right, that while we make a daily use of this substance, we should bless that God who has given it. Choose, among the great number of aliments that which you prefer most : is there one more natural, more wholesome, more strengthening, and more nutritive, than bread ? The smell of the most precious aromatics is not so restorative as that of bread ; simple as it is, it contains particles essentially proper to form and repair the nervous fluid. What demonstrates its nutritive quality is, that, moistened with water, it quickly dissolves, and becomes a glutinous paste, and, consequently, the stomach can easily digest it. Let us consider here the concern which the Creator has evidenced for our health, in assigning us bread for food. Our best juices are liable to be corrupted : a nourishment,

 The utility of bread.

therefore, that could resist this putrid tendency, was necessary ; and this quality is found in bread. As this aliment comes from the vegetable kingdom, and has a certain acidity in it, it is an excellent preservative against putrefaction. Another advantage is, that we can give bread whatever degree of consistence we please, so as to render it proper for the necessities of the stomach ; or to keep any given length of time. I should be utterly unworthy to receive that bread which nourishes me daily, were I insensible of this benefit. Why should I not be grateful to this tender and beneficent Father, who causes bread to grow out of the earth, to nourish and support me ? Should I resemble the brute, enjoying the nourishment without thinking of Him who gives it ? Shall I daily eat and be satisfied, and forget him who nourishes me ? No, my God : my grateful heart shall render thee those thanks which are due to thy name for this blessing. It is enough that during my infancy I have received my nourishment without being able to raise up my soul to thee : now that I know the hand that feeds me, I wish to bless it incessantly.

But how can I better prove my gratitude, than in dividing this bread, which I so abundantly enjoy, with those who receive it in a more sparing way ? O, my Father, how many of thy children are not so comfortably provided for, though they may deserve it much better than I do ! They have scarcely bread, and are destitute of other means of providing for their subsistence. As for me, I have received all these advantages from thy hand, and I am ready to give a portion to my poor brethren, who have an equal right with me to thy benefits. I wish for power to relieve all ; I know but a small part of the distressed, and I am not sufficiently rich to pour upon all these the gifts of beneficence. But thou knowest all the indigent, and thou canst and wilt satisfy those who cry unto thee in their distresses. I ask this from thee in their behalf ; give them the bread which is necessary for their support, and with it give them peace and serenity of soul ! Let me also obtain these same gifts from thee ; then shall I be more happy with bread for food, and water for drink, than the rich epicures are in the use of the most delicious viands and most exquisite wines.

 JANUARY XXX.

OUR DUTY IN RESPECT TO SLEEP.

AN afflicting remark, which we are often obliged to make, is, that most people abandon themselves to sleep with an inconceivable carelessness. Considering it only in respect to our bodies, the revolution which sleep produces in them should appear to us one of the most important. But if we consider it in other respects, and figure to ourselves what may take place during the repose of the night, it appears to me, that we should never venture to cast ourselves into the

Our duty in respect to sleep.

arms of sleep, without taking the necessary precautions, and being, in certain respects, prepared for what may take place. It is not, indeed, surprising that those who, during the day, are so inconsiderate and negligent, should be equally so during the night : but as for us, we should endeavour to learn how we may best glorify God even in sleep, and discharge those duties which Christianity imposes on us.

How thankful should men be to the Creator for the blessing of sleep ! Perhaps you have never known the full worth of it, because it has never refused to fulfil your wishes when you called it. But how often does it happen that sickness, discontent, fear, or old age, have deprived men of the sweets of sleep ! In these cases we learn, that sleep is one of the most pressing necessities of nature, and, at the same time, one of the most inestimable blessings of the Deity. But, will you, in order to become instructed in this matter, wait till you have lost this benefit ? No : while you enjoy the advantages which sleep procures ; while, at the commencement of each night, it gives you to feel its salutary effects, never give up yourself to enjoy it without the most lively sense of gratitude to your heavenly Benefactor. And let this gratitude prevent you, on the one hand, from abusing sleep ; or, on the other, by an opposite excess, from not taking what is sufficient. We are always culpable when, through idleness or effeminacy, we prolong the hours destined for repose. Nature, in this respect, as in all others, is contented with little : seven or eight hours of uninterrupted sleep are generally sufficient. But men are not less culpable, when, through avarice, ambition, or any such motives, they abridge their sleep, and refuse that relaxation to nature which is necessary. In both cases, the established order of God is disturbed, and the gratitude which you owe to him for the blessing of sleep is wounded.

Above all things, endeavour to lie down with suitable dispositions. What would you do, if you were assured that from the arms of sleep you should pass into the arms of death ? Would you not employ your last waking moments in preparing yourself for your change ; in examining your life, and seeking in the blood of Jesus the remission of your offences ? And can you not, at the beginning of each night, see this to be a possible case ? In every night of winter, i. e. in the space of from 12 to 15 hours, there die at least 50,000 persons ! Who knows but your name may be written in the list of those who shall this night be removed from the earth ? Now I shall leave the decision to your own heart : what would you wish to have done, if, in the midst of sleep, you were called to appear before the judgment-seat of Christ ?

“ If, during this night, thou shouldest be called to appear before him, art thou ready ?—O God ! to whose eyes every thing is open, and from whom we can hide nothing, we daily feel the weakness of our nature ; we acknowledge our sins : pardon us, for the sake of Christ ; wash us from our sins in his blood ; and, for his sake, enter not into judgment with us ! ”

JANUARY XXXI.

THE REVOLUTIONS WHICH ARE CONSTANTLY CARRIED ON IN NATURE.

ALL the vicissitudes of nature are derived from those invariable laws which the Creator established when he drew the universe out of nothing. For 5000 years, at certain specified times, the return of the same revolutions, and the same effects, have been observed in the heavens and upon the earth. The sun, the moon, and the stars, continue in that order which was first prescribed to them. But who has prescribed it, and who preserves and directs them in it? Who has taught these bodies the path they are to go in, and who has pointed out to them the times of their revolutions? Who has caused them to move always with the same degree of velocity? Who hinders them from falling upon our globe, or from straying in the immense expanse of heaven? In a word; whence is it that their courses are never disturbed? All these questions necessarily lead us to God; it is he who has marked out the orbits in which they are to revolve; it is he who supports, guides, and prevents them from making any irregular movement. By laws, which are to us unknown, he causes the celestial bodies to roll on with an inconceivable velocity, and in so perfect an order that nothing can disturb them.

He produces continual revolutions in the elements much nearer to ourselves, though they are not visible to an ordinary capacity. The air is in perpetual motion whilst it turns round our globe: the water also pursues its course without interruption: the rivers fall into the sea, and from its extensive surface those vapours arise which form clouds. They fall down upon the earth in snow, hail, and rain; they penetrate the bosom of the mountains, and feed the spring, whence those streams proceed, which being increased in their courses, become rivers. Thus the water which fell from the clouds, returns again into the sea. The seasons also endure a limited time, and succeed each other in an established order. Every year the fruitful earth reproduces plants and crops; nevertheless, she is never exhausted; for, because of the constant circulation which takes place between the nutritive particles, whatsoever she gives is restored to her again. Winter comes at the determined time, and leads her to the repose which she requires; when winter has accomplished the designs of the Creator, he retires, and spring takes his place, and restores to the earth the children she had lost. The same circulation may be observed in the body of every living creature. The blood runs incessantly in the different canals, distributing to each member the nutritive juices necessary for it; and then it returns to the heart whence it proceeded. All these revolutions recall the idea of the Supreme Being, who has established the foundations of them from the creation of the world; and who, by his power and wisdom, continues to direct them to the present moment.

These reflections are worthy our attention, and ought to be particularly considered at the close of this month. Under the wise direction of Providence, all the revolutions which have taken place in nature during the course of the month have been produced in a way the most conformable to the designs of the Creator. Each day the sun has enlightened us, and, having accomplished his appointed work, he yields the dominion to the night. Each day has the goodness of God been renewed towards us, causing every revolution to contribute to our well-being.

And now, this month, with all its days, all its hours, and all its moments, is for ever passed away. It is impossible that it should ever appear to us in the same relation, were we to survive fifty winters. But, finally, all the wheels of the machine of the great system of the universe shall at last stand still. The circular motion of the globes shall cease, the springs of nature shall lose their elasticity, and days, months, and years, be swallowed up in eternity !

Then, O eternal, unchangeable, and infinite Being, thou shalt still exist ! and by thee alone the duration of my being shall be eternally measured ! Blessed be God, that each month which passes by, carries me nearer to that period when my everlasting felicity shall commence.

FEBRUARY.

FEBRUARY I.

EVERY THING IN NATURE TENDS TO THE GOOD OF MANKIND.

BE deeply sensible, O man, of the love and preference with which God has honoured thee, in distinguishing thee with so many advantages from other creatures ! Feel, as thou oughtest, the incomparable blessing of being peculiarly the object of the divine liberality ; of being, in some sense, the centre of whatsoever he has formed for the manifestation of his glorious attributes.

It is for thee that all nature acts ; for thee, she labours in the earth, in the air, and in the waters. For thee, the sheep is covered with wool ; for thee, the horse's foot is armed with horn, of which he could not stand in need, were he not destined to draw heavy loads, and to climb mountains. For thee, the silkworm spins her clue, shuts herself up in it, and afterward abandons to thee the web which she had so artificially woven. For thee, the gnat lays her eggs in the water, that they may become nourishment to crab, and other fish, which shall themselves become means of thy support. For thee, the bee gathers exquisite honey from the bosom of the flowers. For thee, the ox is yoked to the plough, and asks for the recompense of

Every thing in nature tends to the good of mankind.

his labours only a slight nourishment. For thee, the forests, the fields, and the gardens, abound in riches ; the greater part of which must be lost, were they not to be used by thee ; as would also the greater part of the treasures shut up in the mountains.

It is true that thou hast, beyond comparison, more wants than other animals ; but hast thou not also incomparably more faculties, talents, and industry, to make all that surrounds thee contribute to thy service and pleasure ? Thousands of creatures unite to nourish, clothe, and furnish thee with innumerable comforts and conveniencies. If God have created thee with so many wants, it is certainly to procure thee the greatest variety of pleasing sensations. It would be impossible for thee to satisfy thy multiplied wants, if those of other animals were equal to thine. And to the end that thou mightest lack nothing, but have all things in abundance, what is necessary to them, is that of which man, in general, can make no use.

But it is not thy food alone that God has provided with so much liberality ; he has condescended to procure thee a thousand other pleasures. It is for thee, that the lark and the nightingale sing ; that the flowers perfume the air ; that the fields and the gardens are adorned with so many different hues. Above all, he has endued thee with reason, which gives thee power to make all things subservient to thy support and thy pleasure ; to rule over the animals, to take the whale and the lion ; and to do what is still more excellent, to delight thyself in the works which he has made ; to contemplate their beauty, grandeur, and magnificence ; to admire their order, harmony, and wonderful connexion.

O man ! so highly privileged and loaded with favours, how canst thou be sufficiently grateful to thy heavenly Benefactor ? What love canst thou feel to thy Creator, that can be in any wise equal to that which he has manifested to thee ? But, to inflame more and more thy love and gratitude, reflect frequently on the boundless liberality of the Father of nature ; on the peculiar love with which he has honoured thee ; and on the innumerable benefits which thou hourly receivest from him. Often consider, that there is not a creature upon the earth so favoured ; a creature for whom God has made so many things, as for thee. Look round thee, and contemplate the wonderful magnificence of nature : ask the heavens, the earth, the sea, all the animals, all the plants ; in a word, all the beings which exist here below ; and they will tell thee, that thou art that happy creature to whom all others are subservient, and for whom all around thee was made. Let thy soul then be penetrated with the most lively gratitude ; and with the most ardent love to thy glorious Benefactor : and let it be thy chief care, thy only ambition, to live to him who has given life and being to so many different creatures for thy sake.

Such resolutions as these, thou oughtest to form in the beginning of this month. Each day will afford thee fresh occasion to acknowledge and celebrate the paternal care of Providence, exercised in

Every thing in nature tends to the good of mankind.

behalf of thy life, maintenance, and comfort. Taste and relish the divine bounty in every morsel of bread afforded thee for thy support, and in every glass of water granted thee to quench thy thirst, and to refresh thee. But especially, acknowledge the kindness of the Lord in those blessings which he reserves for thee in eternity. For thee, also, Jesus Christ has designed that ineffable happiness which his faithful disciples shall enjoy around his throne. Happy spirits shall be thy companions and thy friends ; and thou shalt partake with them of those glorious blessings which infinitely surpass all that is seen here below. "What is all the happiness of the present life, compared with that which awaits us in the habitation of the Almighty ! Even here, we continually experience the effects of his kindness ; and are encompassed with the wonders of his goodness : but on this earth, pleasure is continually intermingled with pain : perfect happiness is only to be found in the kingdom of God."

FEBRUARY II.

THE INFLUENCE WHICH COLD HAS UPON HEALTH.

IN these severe winter months, it is not unusual to hear great eulogiums on the other seasons of the year. Spring, summer, and autumn, whose worth is but little attended to when we enjoy their blessings, are rated even beyond measure, when we can no longer profit by their advantages. This is the general custom of men : while they possess certain blessings, they do not value them as they ought ; and they only begin to know their worth when they are deprived of them. But is it true, that these three seasons exclusively deserve our attention and praise ? Is the winter really what it is often represented, the enemy of our pleasures, and the destroyer of our health ? As this prejudice may have considerable influence upon our ease and contentment, it will be necessary to reflect impartially on the advantages of the present season, with respect to our health.

Spring and autumn are very dangerous, because of the sudden alteration which takes place in the temperature of the air. In summer, the air is laden with putrid vapours ; or, at least, with such as have a tendency to become putrid. In this season, people are subject to colds, which occasion a multitude of painful, and oftentimes mortal diseases. Winter has not these inconveniencies. Cold favours insensible perspiration ; and by this means prevents a number of terrible disorders which owe their rise to its obstruction. By this gentle and moderate perspiration we feel ourselves more light and active ; the blood is purified, the appetite increases ; so also do cheerfulness and serenity of mind. Besides, the cold braces and fortifies the solids, and thus supplies the lack of exercise. What inconveniencies does the great heat of summer produce ! What oppression and hea-

The influence which cold has upon health.

viness do we feel when obliged to stay long in the open air ; and bear, so to speak, the whole weight of a burning atmosphere ! How earnestly do we long for the coolness of the night, that in it we may be reanimated, and acquire new strength ! The fine days of winter have not these inconveniencies. We have more activity, vigour, and courage ; and are better disposed both for labour and pleasing employments. The cold obliges us to walk fast, and to take such exercise as may procure us a moderate warmth.

Thus, we may perceive that the winter contributes to our pleasure and health. The Creator has provided for our well-being in this season, as well as in others ; and he has made the wisest arrangements for the preservation and happiness of his creatures in each month of the year. If we are not so contented during the winter ; if we do not enjoy as good health as in other seasons, it is incontestably our own fault. Perhaps we spend our time in idleness : probably, always shut up in our own warm apartments, we never respire a pure air, nor profit by the fine winter days. Probably we give ourselves up to discontent, and anxious solicitude concerning the future : perhaps we transgress the rules of sobriety, and run to excess in eating and drinking : or, perhaps, we have abused the summer days, and by an irregular line of conduct ruined our health, the melancholy effects of which we now feel. How happy might men be, how uniform and excellent their health, if they followed the laws of nature, and caused labour and rest, business and pleasure, to succeed each other !

O my benign Creator, I acknowledge, with lively gratitude, the wise ends which thou proposest in the government of the world ! I bless the paternal care with which thou providest for my preservation, my quiet, and my well-being, in all the revolutions of the year. Shall I then be so imprudent as to render a season painful and disagreeable, which may become a source of the most pure and innocent pleasure ? Shall I wantonly destroy my health and life, whilst thou art employed, with so much goodness, to preserve and strengthen them. No : I shall endeavour, henceforward, to answer thy wise and beneficent designs. Contentment of mind, and cheerfulness of heart, shall render my days agreeable ; while temperance and virtue ensure me a sound and durable state of health.

FEBRUARY III.

A CONSTANT EQUALITY OF TEMPERATURE WOULD NOT BE BENEFICIAL TO THE EARTH.

WE imagine that our earth would be a paradise, if, at all times, and in every place, there were an equal distribution of heat and cold ; the same fertility ; and the division of days and nights. Thus we poor, frail, short-sighted mortals think, who refer every thing to our

Change of seasons beneficial to the earth.

own interests. But, supposing that these things were arranged as above, is it certain that men would be gainers in respect to food, conveniencies, and pleasure? So far from it, that, on the contrary, the earth would be the most dreary and miserable habitation for all creatures, were God to conform himself to the plan which we have prescribed to him. By the present arrangement there is an infinite diversity in the works of the Creator. But how gloomily uniform, and how destitute would the earth be of beauties and gratification, if the revolutions of the seasons, if light and darkness, cold and heat, did not take place? Thousands of plants and animals, which cannot live but in those countries where there is a certain degree of temperature, could not exist. Among the immense multitude of nature's productions, there are very few which could succeed equally well in all climates. The greater part of creatures which are found in cold countries, could not bear the heat of warmer climes: while, on the contrary, those who inhabit warmer climates, would perish in cold countries. Were there in all places an equality of heat, many of the present productions of the earth could not exist: nature would be deprived of a great part of the charms of *variety*; and we should lose innumerable blessings. If every country on the earth produced the same thing, and had the same advantages, all communication between different nations would cease: there could be no traffic, no commerce, and many arts and trades must be unknown. And what must become of the sciences, if the mutual wants of different nations did not lay them under a happy necessity of communicating with each other?

But supposing that the heat were equal in all parts of the world, could we determine what the degree of heat should be? Should it be as warm every where as in the torrid zone? But who could bear such a temperature? For, the colder regions receiving from the others a measure of their warmth, the heat diffused over the earth would be considerably augmented, and exceed that of the torrid zone; and if it were of the same degree every where, men, animals, and plants, must be consumed; all must perish! But suppose there were the same degree of temperate heat all over the earth, which should be adapted to the state of all the creatures; then the atmosphere must have the same degree of elevation, the same density, and the same elasticity. Hence the earth would be deprived of one of the principal causes of winds; and what inexpressible mischief would result from this? The air, which is so essential to the preservation of our life, would soon become the most destructive of all poisons, if not purified by the winds. The equality of heat over the earth, would occasion sickness, contagion, and pestilence; and our pretended paradise would be no other than a real desert, a true chaos.

Wise and beneficent Creator! all that thou hast done is well done! This acknowledgment is the result of all the reflections I have made in contemplating thy works. I wish to accustom myself to think

Change of seasons beneficial to the earth.

thus, at the sight of every object which the kingdom of nature presents : and if at any time I imagine that I have discovered faults or imperfections, I shall correct myself, by calling to mind thy infinite wisdom, and the weakness of my own understanding.

Many things which at first sight appear useless, and contrary to the order of the world, are arranged with admirable wisdom and goodness. That which appears defective and imperfect to me, furnishes more illuminated minds with strong reasons to admire and celebrate the infinite perfections of the Creator. And, supposing I should not always be in a capacity to acknowledge the wisdom and goodness of God in the creation and preservation of the world, it should ever satisfy me to know, that Jehovah hath done all things well.

Such shall be my judgment henceforth concerning the moral government of God, and his dealings with intelligent creatures. As in nature he has distributed, in an apparently unequal manner, cold and heat, light and darkness ; he has shown also a great diversity in his dispensations towards rational creatures ; and has not regulated the lot of each in the same way. But here, as in nature, his ways are always the ways of wisdom and goodness. Even as our globe could not subsist, were there not heat and cold ; it is certain that the world must be destroyed, were there a perfect equality in the lot of all human beings. All that the Lord has regulated and ordered, is perfect and admirable. All his paths are mercy and truth to those who keep his covenant and his testimonies. To him be glory for ever and ever !

FEBRUARY IV.

THE UTILITY OF THE STARS.

IN the eye of every person who delights to reflect on the works of God, the starry heavens is an admirable theatre of the wonders of the Most High. The order, grandeur, multitude, and splendour, of these celestial bodies, present the most magnificent sight to an attentive observer of nature. The mere view of the stars, supposing we had no knowledge of their nature and design, would be sufficient to fill the mind with admiration and joy. For, what more majestic and beautiful can be seen, than that immense expanse of heaven, illuminated by lamps without number, which the azure face of the sky causes to appear more glorious ; and which differ from each other, not only in magnitude, but in brightness !

But could a Being infinitely wise have adorned this celestial vault with so many bodies of immense magnitude only for the gratification of our eyes, and to afford us a beautiful sight ? Would he have created innumerable suns, only that the inhabitants of our little globe, might have the pleasure of seeing certain luminous points in the firmament ; the nature and design of which are but very imperfectly

Utility of the stars.

known, and themselves but rarely noticed ? We cannot indulge such an idea, if we consider, that there is every where in nature an admirable harmony between the works of God and the ends which he proposes : and that in all he does, he not only designs to please, but to profit, his creatures. We cannot doubt, but God, in fixing the stars in the heavens, has had more exalted views than that of procuring us a pleasing sight. It is true, we cannot determine exactly all the particular ends which the stars may answer : but at least it is very easy to acknowledge, that they must be designed for the advantage, as well as the ornament, of the world ; and the following considerations will, doubtless, suffice to convince us of it.

Among those stars which we can easily distinguish, there are some which are constantly in the same region of the heavens ; and which we always see over our heads. These are guides to those who travel by land or water, during the obscurity of the night. They point out to the mariner his course, and inform him when he may undertake his voyages with the least danger, that he may arrive happily at the place of his destination. Other stars vary their aspects ; and though they always preserve the same situation among themselves, they daily change the times of their rising and setting in respect to us. Even these changes, which are brought about in an invariable order, are of great utility to us. They serve to measure time, and to determine it by settled rules. The constant, regular revolution of the stars, mark precisely the commencement and end of the seasons. The husbandman knows, in the most correct manner, when it is time to commit his seed to the earth, and in what order he should conduct the cultivation of his fields.

However considerable the advantage may be which the stars are of to our earth, it is to be confidently presumed that this is neither the only nor principal end which God has proposed in creating so many globes of such prodigious magnitude. Can any person believe, that the wise Creator would have strewed the immense expanse with so many millions of suns and worlds, for the alone end that a small number of inhabitants of our earth might be able to determine times, and to measure the return of seasons ? Without doubt, these innumerable globes have more sublime ends ; and each of them a suitable and particular destination. All the stars are so many suns, which enlighten, warm, and animate other globes. Is it likely that God would have bestowed this property uselessly upon them ? Would he have created suns which can dart their rays to the earth, without producing other worlds which might enjoy their benign influence ? Would God, who has peopled this earth, which is but a point, with so many living creatures, have placed in the immense extent of heaven so many desert spheres ? Certainly not. Probably each of these fixed stars, which we see by thousands, has its worlds which revolve round it ; and for which it has been created. Probably, these spheres which we see above us, serve for habitations to different orders of creatures ; that they are, like our earth, peopled with inhabitants who can admire and cele-

brate the magnificence of the works of God. Probably all these globes, as well as ours, send up incessantly to their Creator, prayers, songs of praise, and thanksgivings.

It is true, that these are but probable conjectures : but these conjectures may be very pleasing and useful to every man who truly loves God. What a sublime thought is this, that, independently of the small number of rational creatures which inhabit this globe, there are innumerable multitudes in those worlds, which to us appear but as luminous points. It is certain, that the limits of our earth are not the bounds of the empire of the Most High. Beyond this world, there is an immensity, in comparison of which our globe, great as it may appear, may be accounted as nothing. Intelligent beings without number may exist there : all magnify the name of our great Creator : all are as happy as their situations can admit ; and, perhaps, all aspire after a better world !

O ye unknown creatures ! beings, which have with me proceeded out of the hands of the same Creator ; I desire, as well as you, to arrive in a better world, where I shall know God and his works, not by conjectures and probabilities ; but by the deepest conviction, and by the most clear and distinct view. Then shall I find myself nearer to those immense spheres, which I see so dimly now ; and of which I have so imperfect a knowledge in this state of distance and ignorance in which I am found. Then I shall take my flight, pass rapidly from one planet to another, ascend from star to star, and magnify the name of the Most High !—O ! when shall this be !

FEBRUARY V.

THE WONDERFUL STRUCTURE OF THE EYE.

THE eye infinitely surpasses all the works of human industry. Its structure is the most astonishing thing that the understanding of man can properly comprehend. The most eminent artist cannot invent a machine of this nature, but what must be infinitely inferior to the eye. Whatever industry or sagacity he may have, he can execute nothing but what must have the imperfections common to the works of men. We cannot, it is true, discover perfectly all the art which the divine wisdom has employed in the formation of this beautiful organ ; but the little that we know of it, will suffice to convince us of the infinite understanding, goodness, and power of our Creator. What is most essential is, to avail ourselves of that knowledge, however little it may be, to magnify the name of the Most High.

First of all, the disposition of the external parts of the eye is admirable. What intrenchments and fortifications has the Creator provided for the safety of our eyes ! They are placed in the head at a certain depth ; and encompassed with hard and solid bones, that they may not be easily injured. The *eyebrows* contribute much to

 Wonderful structure of the eye.

the safety and preservation of this organ. The *hairs* which form an arch above the eye, hinder, not only the drops of sweat from the forehead from falling into it, but also dust, and such like matters. The *eyelids* are another defence : and, besides, as they shut when we go to sleep, they prevent the action of the light from interrupting our repose. The *eyelashes* are instrumental to the perfection of the eye : they protect it from the injury it might receive from too much light, by excluding the superfluous rays ; they also prevent the dust from falling into the eye.

But the internal structure is yet more admirable. The whole eye is composed of tunics, muscles, and veins. The tunic or exterior membrane of the eye, which is called the *cornea*, is transparent ; and so hard that it is capable of resisting severe blows. Behind this there is another, termed the *uvea*, which is circular and coloured. In the centre of this there is an opening, which is termed the *pupil* of the eye ; and appears to be black. Behind this opening is the *crystalline humour*, which is perfectly transparent, of a lenticular shape, and composed of many small *laminae* or *layers*, exceedingly thin, and placed one on the other. Under the *crystalline*, there is a limpid and transparent substance which is called the *vitreous humour*, because it resembles melted glass. The cavity, or outward chamber, between the *cornea* and the *crystalline*, contains a humour, fluid and limpid as water, and which, on this account, is termed the *aqueous humour* : this may be produced after having run out through a wound of the cornea. Six muscles, admirably well arranged, move the eye on all sides ; elevate, depress, turn it to the right or left, obliquely, or round, according as necessity may require. What is most wonderful is the *retina*, a membrane which lines the bottom of the eye. It is no other than a web of extremely fine fibres attached to a nerve which comes from the brain, and which is called the *optic nerve*. Vision takes place on the retina, because the objects are painted in the bottom of the eye on that tunic ; and although the images of external objects are painted in an inverted order on the retina, we nevertheless see them in their true situation. To form an idea of the extreme minuteness of the image thus painted on the retina, we have only to consider that the space of half a mile, i. e. more than eight hundred yards, painted on the bottom of the eye, occupies but the tenth part of an inch !

I render thee thanks, O Lord my God, that thou hast formed my eye in so wonderful a manner ! My soul acknowledges thy infinite wisdom, power, and goodness, in the arrangement of all the parts of my body. Until now, I have not considered my eye as it should be considered, i. e. as a master-piece of thy handy work ; and as a demonstrative proof, that my body, even in its smaller parts, is not the work of chance ; and that thou hast not formed it without proposing to accomplish the most excellent ends. But, at present, I begin to get a glimpse of the wonders of thy goodness ; and I am struck with astonishment, in considering myself, and the other works which

thou hast formed. Incline me to remember thy benefits with more gratitude, and to glorify thee by the use of my eyes ! Teach me to use them in such a manner as to answer the end for which thou hast given them ; that I may never abuse them, and that this beautiful organ may never be profaned or dishonoured by any fault of mine ! Grant that I may hereafter use my eyes to consider thy works ; and that as often as I contemplate the heavens, the earth, or myself, I may be excited to love and praise thy admirable goodness ! And, when I see the different woes and miseries, under which many of my fellow-creatures groan, let not my eyes refuse tears, nor my heart be shut up against compassion. But, may tears of joy flow from my eyes, as often as I receive any new mark of thy goodness ; or am enabled to do any good to the poor and afflicted, to relieve them in their distresses, and to wipe away their tears. Thus shall I fill the intentions of thy goodness, and enjoy the approbation of my God.

FEBRUARY VI.

THE FOG OR MIST.

AMONG the many meteors which we see in winter, one merits our particular attention ; the *fog*. This is only a collection of aqueous and sulphureous vapours, which fill the lower region of the atmosphere, and are then condensed. This condensation is principally caused by *cold* : and in order to form fogs, the air must be sensibly colder than the earth, whence exhalations continually arise. Fogs not only diffuse a gentle humidity over the earth, but furnish our eyes with a very pleasing sight. Every object, whether near or remote, the heavens or the earth, appears to be confusedly enveloped with a kind of gray curtain. Around and above us we see nothing but obscurity ; and the eye wanders from place to place without being able to distinguish the objects. The rising sun labours a long time to pierce these mists, and restore to the earth the appearance it had before : at length he succeeds in dissipating these vapours : sometimes they descend upon the earth ; at other times they arise to the middle region of the air. Objects, by little and little, emerge from that uniform obscurity with which they were encompassed, and appear in their usual form. The heavens regain all their brightness and serenity ; and it is only close to the ground, or on the roofs of houses, that we perceive any traces of that fog which for several hours had covered the horizon.

At the appearance of this meteor, I recall to mind that dreary time when the sciences were, so to speak, covered with the impenetrable mist of superstition and ignorance. In what thick darkness were whole provinces and kingdoms, before the sun of truth could show himself in all his splendour. The light of the human mind was so very imperfect, and its sight so bounded, that men did not know the

The fog or mist.

things with which they are encompassed ; and the power of error was such, that no ray of light could penetrate those souls which were darkened by prejudice and superstition. At last the sun appeared, and suddenly illuminated all those countries, which, during whole ages, had been buried in the deepest shades. We became capable of distinguishing truth from error ; a blessed eternity was opened to our view ; and we began to feel all the grandeur of our destination. Blessed LUTHER ! this thou hast done, by the strength and grace of God. Thy memory shall be always blessed among us, and thy memorial shall be eternally precious !

It is still too true, that as long as our earthly pilgrimage lasts, we walk in comparative darkness. The mist which surrounds us prevents us from taking a clear and distinct view of futurity. Our ignorance, prejudice, and unbelief, augment the darkness of our present state. May they be speedily dissipated ! May the light of truth and joy speedily illuminate us in this valley of obscurity ! Blessed be God, the way opens before me ; and through the shadows which surround me, I get a glimpse of the path that leads to a glorious eternity ! Soon the clouds shall disappear, and I shall be transported into the habitation of light and felicity, where no shade shall ever obscure my view. “ Then I shall know, in the brightness of the Lord, that which, upon earth, appeared dark and gloomy. There I shall perceive the wisdom and holiness of those ways of Providence which I found incomprehensible here below. There my soul, penetrated with admiration and gratitude, shall see the marvellous connexion, and perfect harmony, of the works of the Most High.”

FEBRUARY VII.

THE FLUX AND REFLUX OF THE SEA.

THE greatest part of the surface of the earth is covered with water : this is called *sea* ; and this immense mass is very distinct from lakes and rivers. Those contain less or more water, according to the seasons ; whereas the sea always contains nearly the same quantity. But it is observed that the sea ebbs and flows, twice each day, according to certain rules. When it is found at its greatest height in any port, it begins immediately to decrease ; this decrease, or ebb, lasts six hours, and then the sea is found at its lowest state. At the end of six hours, it begins again to flow ; and continues increasing six hours more, at the end of which, it is again found at its greatest elevation. Then it falls back during six hours, and rises again in the same space of time ; so that in 24 hours the sea has ebbed twice, and flowed twice : i. e. it has been twice at its lowest, and twice at its highest state.

This alternate regular motion of the waters, is called the *flux* and *reflux*, or *ebbing* and *flowing* of the sea. When it retires from the

Flux and reflux of the sea.

coasts, it is called the reflux, when it advances towards the shore, it is termed the flux. The most remarkable thing in these tides is, that they are regulated according to the course of the *moon*. The flux is greatest at the new and full moon; and least in the quarters. This motion is more considerable in spring and autumn, than in the other seasons: on the contrary, the tides are much weaker at the solstices. This phenomenon is especially remarkable in the ocean, where the water occupies a greater space: and is much less discernible in small and limited seas, such as the Mediterranean. The interval between the flux and reflux is not precisely six hours; it is eleven minutes more: so that these revolutions do not happen exactly at the same time the next day; but three quarters of an hour later. The tides do not return at the same hour, till about the end of thirty days, which is precisely the time from one new moon to another.

We may certainly conclude, from this regular and constant phenomenon, that the flux and reflux have a particular connexion with the motion of the moon. But, without pretending at present to fathom the cause of this effect, in which there is still much obscurity; without deciding whether the flux and reflux come from the moon's pressure upon the waters, or the gravitation of the parts of the earth towards the moon, let us especially reflect on the ends which God has proposed to effect by these remarkable revolutions. It is a pardonable ignorance, not to be able perfectly to explain the order and laws of nature: but it is an ungrateful, and inexcusable inattention, not to reflect on the advantageous influence which these laws, and these grand phenomena, have upon the earth; or to forget what we owe to the beneficent Father of nature.

The first advantage which the flux of the sea procures us is, that it drives back the waters into the rivers, so as to make their channels sufficiently deep to carry vessels laden with merchandise to the very gates of great cities; and without this, the carriage of goods would, in many cases, be impracticable. Vessels wait some time for this increase of the waters; and they avail themselves of it, to enter bays without touching the bottom, or to get into channels of rivers without danger. After this important service, the tides diminish, and permit the river to return into its channel. Thus the retiring waters give others the opportunity of returning with more speed for other cargoes.

Another advantage which we derive from this flux and reflux of the sea, is, that it prevents that stagnation which would lead to putrefaction. It is true, the wind also contributes much to this; but there is often a great calm on the waters; and this would beget putrefaction in the sea, which is the receptacle of all the impurities of the earth. God has then established the flux and reflux, to prevent injurious stagnations: the ascending and descending motion of the waters attenuates and separates these corrupt particles every where, which, without this, would speedily fall to the bottom.

Flux and reflux of the sea.

These reflections may naturally recall to our minds one circumstance, which has much affinity to the phenomenon we have now been considering. Life itself is but a flux and reflux : it increases and diminishes : all is inconstant, and subject to change. Nothing is durable. There is no earthly joy, hope, or happiness, permanent : we swim in a rapid and inconstant river. Let us take heed that we be not carried into the abyss ; and let us endeavour to arrive safely in the desired and delightful haven. Let us thank God, that our difficulties and distresses cannot be of long duration. Long and excessive grief is as incompatible with our nature here, as constant and perfect earthly felicity. But even these vicissitudes are incontestably advantageous. If we should enjoy an uninterrupted felicity during the whole course of our life, we might easily be puffed up, and forget God. On the other hand, a continual succession of distresses and misfortunes might plunge us into melancholy, and harden our hearts. Let us therefore bless our heavenly Father for the wise arrangements which he has made in this respect ; and let us endeavour to conduct ourselves in all the circumstances and events of life, in prosperity as well as in adversity, in such a manner as may be worthy our vocation, and the hope which we entertain of eternal life !

FEBRUARY VIII.

THE SUN DOES NOT ALWAYS APPEAR.

THE sky is not always covered with rainy or snowy clouds. Sometimes the clouds divide, after having poured out upon the earth that abundant provision of water which they had concealed ; and then the most pleasing serenity is spread over the sky. The face of the sun, of which obscure clouds had deprived us for some days, revives the various tribes of animals, and fills them with joy and gladness. During the summer days we are accustomed to the presence of this beautiful luminary : but as in winter he very rarely shows himself, and when he does, it is only for a few hours, we then learn better how to appreciate his benefits. And is not this one observation which we ought to make concerning all the gifts which we receive from the hand of God ? Is it not true, that we seldom properly esteem the blessings of this life ; and that we regard them with indifference, when they are constantly in our possession ? Health, rest, friendship, a decent income, and a thousand other blessings which we daily enjoy, do not appear to us so considerable as they are in effect : and often we do not begin to think of their excellence till we have lost them. It is necessary that we should be laid on a sick bed, be deserted by all our friends, and be reduced to poverty and want, that we may know what a blessed thing it is to enjoy good health, to have a faithful friend, and the means of an honest subsistence.

The sun does not always appear.

When the sky clears up, after being a long time obscured by clouds, the earth, for some time afterward, presents a very gloomy aspect. It is true, that it is cheered a little by the sun's rays ; but this is not sufficient to restore it all its beauty. The sun has not as yet sufficient strength to overcome the cold, which has frozen the earth ; or to reanimate nature, which appears dead. Thus also, the light of the understanding does not always warm the heart. All those who languish in want and affliction feel this. It sometimes happens, that in the winter of life, or in other afflictive and mournful circumstances, men get a distant glimpse of joy and pleasure, without the power of tasting their sweetness ; or of being strengthened by having them in possession. Nevertheless, we owe thanks to our heavenly Benefactor for those rays of joy, which, from time to time, visit our souls, and sooth our cares and troubles, though but of momentary duration. I stop here, O my God, and ask this favour : should it be thy will to assign me, in my old age, some dark and melancholy hours, grant that I may not murmur at it ! Grant that I may not lose courage ! Grant that my soul may be animated, from time to time, with rays of joy, and let me have a glimpse of that blessed eternity which awaits me ! All that I dare ask from thee, on this subject, is, a few moments of respite and comfort, which shall enable me to bear with courage my few cloudy days of adversity. How inconstant is the serenity of the sky in these winter days ! How little can we reckon on the genial rays of the sun ! Now he shows himself in sweet majesty ; but quickly he will be covered with clouds, and before mid-day we shall see no more of that splendour and beauty which he has diffused this morning upon the earth. Such also is the inconstancy of all the scenes of our life. We can never promise ourselves durable joys, or uninterrupted pleasures. This should make us wise and cautious in the days of prosperity, and moderate our love for earthly good. All is subject to inconstancy and change. Virtue alone is immutable. This alone can enable us to support the vicissitudes and afflictions of this world ; and strengthen us, in prosperity and adversity, till we arrive in those blissful regions, where we shall be perfectly happy, without any shadow of variation or decay !

FEBRUARY IX.

THE EARTHQUAKE.

OUR earth experiences two kinds of shocks : one caused by the action of subterraneous fires, and the explosion of volcanoes. These commotions are only felt at small distances, and only when the volcanoes act just before a complete eruption. As soon as the matter, which forms the subterranean fires, begins to ferment, and be inflamed, the fire makes an effort on all sides, and if it find not a natural vent, lifts up the earth, and throwing it aside with violence, forms itself a

The earthquake.

passage. Earthquakes of this kind extend only to the distance of a few miles : they shake the earth, as the explosion of a magazine of gunpowder would shake it, which produces a shock, and consequent tremour, which are felt at several miles distance.

But there is another species of earthquake, very different in its effects, and perhaps in its cause too : those terrible shocks which are felt at a great distance, and shake a long tract of land, without producing any new volcano. We have examples of earthquakes which were felt at the same time in England, France, and Germany. These extend much more in length than in breadth : they shake a kind of terrestrial zone, with more or less violence, in different places ; and are almost always accompanied with a dull sound, similar to that of a great coach running rapidly.

To understand the better what the causes of this species of earthquake may be, we shall make the following observations : all inflammable substances, and matter capable of explosion, like gunpowder, produce by ignition a great quantity of air. This air produced by the fire, is so rarefied, that it must produce very violent effects, when it has been for some time pent up, and compressed in the bowels of the earth. Let us suppose, that, at a very considerable depth, one or two hundred fathoms, there should be found pyrites, and other sulphureous matter, which, through means of air, get ignited : they must necessarily seek for vents, and if they find none, they will produce them by violent shocks.

It is impossible to find words to express how terrible and fatal these sort of earthquakes are. Of all the desolations, of all the catastrophes which happen to the earth, there are none so formidable and destructive as earthquakes ; and which so effectually baffle all human power and foresight. When rivers leave their channels, and overflow countries, and sweep whole villages before them, there is still some resource : a man may escape to the tops of the mountains, or oppose dykes to the fury of the floods. But this is impossible or useless in earthquakes. There is scarcely any other kind of danger but one may escape. Lightning has never consumed whole villages and provinces. The plague, it is true, may nearly depopulate the greatest cities ; yet not entirely destroy them : but the calamity we speak of extends, with an irresistible power, over a whole country, and swallows up whole nations and kingdoms, without leaving a vestige behind of their former existence !

Sovereign, Almighty Being ! who can stand before thee when thou exercisest thy power ? Who can withstand thee when thou arisest to judge the nations ? The earth trembles, and is shaken before thee ; the foundations of the mountains reel to and fro, when thy anger is kindled ! *The mountains quake at him, the hills melt, and the earth is burnt at his presence ! Who can stand before his indignation ? And who can abide in the fierceness of his anger ? His fury is poured out like fire ; and the rocks are thrown down by it.* Nahum i. 5, 6. Who would not

The earthquake.

fear thee, O King of the earth ! O Lord, we acknowledge and adore thy sovereign majesty ! Thy judgments are incomprehensible ; but thou art good and merciful in all thy dispensations !

O my soul ! be deeply impressed with this great truth, when the Lord manifests his judgments upon the earth ; when he consumes whole countries in the fierceness of his wrath ; even then, his ways towards his creatures are ways of wisdom and goodness. Canst thou imagine that it is to crush *thee*, that he has ordained these terrible shocks ? *Thee*, who mightest be overthrown with a blast ? Canst thou believe that the Most High needs to employ the elements, and to use the powers of nature to reduce *thee* to powder ? Acknowledge, rather, in these terrible catastrophes, more grand designs. In the Creator's plan, even earthquakes tend to the *stability* of the whole. And supposing that some villages, cities, and provinces, be buried under their ruins ; supposing that many thousands of creatures be destroyed ; what are ten thousand provinces, what are a hundred thousand creatures, in comparison of the whole world, or in comparison of that innumerable multitude of beings which inhabit the creation ? Be well assured, that every thing terrible and frightful in nature, all apparent evil, all the imperfections of the world, are necessary for the preservation of the whole, and for the manifestation of the glory of God.

Great and Almighty Being ! I will bless and adore thy name, even when thou sendest thy scourges upon the earth, and spreadest terror and desolation over it. I will do no more :—I will repose with full confidence on thy paternal care. Though the mountains should fall down and tumble into the sea, and the world be destroyed, thou wilt still be my support, my strength, and my high defence. Thou wilt ever be my aid and my protector, in all the evils which can possibly befall me.

“ Let me only possess a good conscience, and then I shall find nothing terrible in nature, though all should be shaken around me. Should the earth cleave under my feet, and the whole world crumble into dust, I will say, with confidence, God is my rock and my defence, his powerful hand shall always support me.”

FEBRUARY X.

THE ESTABLISHED ORDER OF GOD RELATING TO THE LIFE AND DEATH OF MAN.

GOD has observed the most exact and most wonderful order, in regard to our life and death. So little do both depend upon blind chance, that, on the contrary, they are regulated and measured in the wisest manner. If we establish our calculations on a certain number of years, it will be found, that a proportionable number of persons of every age dies. Out of 35 or 36 living persons, there dies but *one* each year. On the other hand, more are born continually than die

in the same proportion, so that if *ten* die, we may always reckon that *twelve* are born. Besides this, God has shown his wisdom very particularly relative to the different ages of those who die. In the *first* years, out of *three* or *four* infants, *one* ordinarily dies. In the *fifth* year, *one* out of *25*; in the *seventh*, *one* out of *50*; in the *tenth*, *one* out of *100*; in the *fourteenth* and *fifteenth*, *one* out of *200*. The *twentieth* year is nearly equal to the *fifteenth*. After the *twenty-fifth* year, the mortality becomes greater. Of persons at *thirty*, there dies *one* out of *60*. At *thirty-five*, *one* out of *50*, &c.

How evidently does God manifest his wisdom and goodness, in sparing those most who are young; and in what admirable proportion does he remove them from the world! Among a *thousand* that die, there is every where a pretty equal number of persons at *twenty*, *fifty*, *sixty*, and *eighty* years of age. It is granted, that the particular mode of life, vices, war, and epidemic disorders, may carry away more in some years than in others; but here also Divine Providence has taken care to put bounds to mortality in the subsequent years, so that the loss sustained may be abundantly repaired. Let us add to this, that each season of the year is not equally dangerous to men. Spring is most fatal; and the beautiful month of May, in which all nature seems to revive, is more mortal than April and March. But when the warmth increases, in the month of June, maladies sensibly decrease. Summer and autumn are more favourable to health than winter.

Let us admire the providence of God, and his tender care of our life. The days of all are marked in the book of the Most High, from the greatest potentate to the meanest beggar, or infant at the breast. How tranquil ought we to be, seeing our birth, as well as our death, so exactly determined! And how easy should it be to us, to surmount the excessive fear of death! God has, doubtless, determined the bounds of our life in such a way as to be most advantageous to us. If we have the comfortable assurance, that we have found grace with God, through Jesus Christ, we may be certain that we shall not be removed from this world till we are ripe for eternity; and till God has advanced us to that degree of piety which he has appointed for us. Deceived by self-love, we think, at the approach of death, that God treats us with excessive rigour in calling us so soon out of this world; but let us rest assured, that however premature our death may appear to be, it comes exactly at the time in which it is best for ourselves, and for other creatures.

Finally, let us not imagine that this wise order which God has established relative to the life and death of man, authorizes us to reckon with certainty on a particular number of years. It is doubtless true, that fewer persons die in the *fifteenth*, than in the *third* year. But if, in a place where the population is not great, *five* young persons die annually, who can answer for *you*, that you shall not be the *first* or the *last* of these *five*? or if you should pass the *fifteenth*, who can tell you that you shall not die in the following year?

Should not this, on the contrary, stimulate you to accomplish the work appointed you during those years, when it is most probable you may live ; seeing it is uncertain whether some of those in which there is ordinarily a greater mortality, may not be fatal to you.

Above all, be not so foolish as to flatter yourself with the expectation of a long life. Death makes his greatest ravages in those years in which man is in his greatest strength, i. e. from his fortieth to his sixty-fifth year. And when we think we have made our wisest arrangements ; when we have formed our most beautiful plans for a long and happy life ; it is then, I say, that death comes and snatches us away, in the midst of our projects, and in the bloom of our hopes.

How wise should we be, did we make a timely preparation for that day which may any day surprise us ! God, in his wisdom, has so ordered it, that about thirty thousand persons die daily : and how easily may it happen, that some of us may be included in this number ! How necessary is it, that we should think of death daily, and that we carefully prepare for it. Let this be our principal employment : let us make the necessary dispositions early, and be always ready ! Then, let death come whenever it may please the Lord, we shall be found watching ; and in our last moments be able to bless our great Redeemer.

FEBRUARY XI.

REFLECTIONS UPON ICE.

WATER, when condensed by cold, loses insensibly its fluidity, changes in proportion to the increase of the cold, and becomes that solid body which we term *ice*. This change, which in the present season is daily wrought before our eyes, deserves to be particularly considered ; at least, we should endeavour to learn the reasons of some of those phenomena which appear in congealed water.

Ice is a body lighter than water ; for, if we put congealed water into a temperate heat, so that the ice may be detached from the sides of the vessel, it always swims at the top ; and were it weightier than the water, it would necessarily sink to the bottom. What makes it lighter is the increase of its size ; for although it becomes at first more compact than the cold, yet it becomes much dilated when transformed into ice. This dilation is formed with so much violence, as to be capable of rending a copper globe so thick that it would require a force of *one thousand and twenty-eight pounds* to produce the like effect.

When the icy crust is formed on the surface of the water, the ice is as yet entirely transparent ; but as it thickens, it becomes opaque. This opacity is produced by bubbles of air, of different sizes, which are included in the ice, and which occasion a more frequent refraction of the rays of light. Ice exhales a great many vapours even in the severest cold. It has been found, by experiments frequently repeated,

that when the cold is most intense, four pounds of ice lose, by evaporation, a whole pound of its substance in eighteen days ; and that a piece of ice, of the weight of four ounces, loses four grains of its weight in twenty-four hours. Ice is formed commonly at the surface of water. It is an error to suppose that it is formed at the bottom, and that it afterward swims ; for the cold, by which it is formed, coming from the atmosphere, that cause cannot operate at the bottom of the water without having previously congealed all that was above.

The manner in which ice is formed, is not less remarkable, which is this : when it freezes gently, a multitude of small threads may be seen, proceeding from the interior circumference of the glass, in different directions ; and forming all sorts of angles among themselves, they unite on the surface of the water, and then form a very thin pellicle of ice. These first threads or filaments are succeeded by others ; they multiply and increase in the form of thin plates, and being increased in number and thickness, they unite themselves to the first pellicle or crust. In proportion as the ice thickens, a multitude of air-bubbles appear ; and the more intense the cold becomes, the more these bubbles increase. Hence it is, that the transparency of the ice diminishes, especially towards the centre ; and then it begins to dilate violently, and swell to a greater size. When the cold is very keen, and it freezes violently, a thin membrane is formed on the surface of the water, which proceeds from the sides of the glass, towards the centre. Under this membrane others are seen, which appear in the form of triangles, the base of which is towards the side of the glass, while the more acute angles are directed to the centre. Thus the icy crust thickens, is rendered opaque by the included globules of air, is dilated, and becomes lighter and lighter.

But, having reflected on these phenomena, is it not very natural to say to one's self, What order and harmony prevail, even in the least works of nature ! Every thing is regulated in weight and measure, according to times and seasons. All nature co-operates with God to fulfil his purposes ; and had we a more distinct and perfect knowledge of the wise counsels and designs which God proposes in each phenomenon, what would our astonishment be ! However, the little we do know of these things should excite us to adore the wisdom of the Creator, and to magnify his holy name !

FEBRUARY XII.

THE SPHERICAL FIGURE OF OUR EARTH.

PEOPLE generally suppose the earth to be a level plain, a round flat surface ; but, were this the case, the exterior bounds of this surface may be found, and in approaching any place, it would be impossible to discover the tops of towers and mountains, till we had seen their bases. The earth is a globe, but not absolutely spherical ; for it is a

The spherical figure of our earth.

little raised at the *line*, and flattened at the *poles*, so as nearly to resemble an orange. But this deviation from the absolutely circular form is very inconsiderable, at most only 50 English miles, which is scarcely sensible in a globe whose circumference is 23,892 English miles, and 7,964 in diameter. No doubt can remain of the spherical figure of the earth, if we only consider that in eclipses of the moon, the shadow which the earth casts on that planet is always round. Besides, if the earth were not round, how could men have sailed round it, and how could the stars rise or set sooner to the inhabitants of the eastern parts, than to those of the west?

Here is another manifestation of the wisdom of the Creator. The form which he has given this earth, is the most suitable and convenient to a world, such as ours, and to its inhabitants. The light and heat, which are so necessary for the preservation of the creatures, are, by this means, distributed, in an equal and uniform manner, all over the earth. It is through this that we have the regular returns of day and night, of cold and heat, of moisture and drought. First, the waters are distributed in equal proportions to all the globe, and the winds breathe their salutary influences in every part of the earth. We should be deprived of all these advantages, if the earth had any other form. Some countries would be a paradise, others a chaos. One part would be overwhelmed by the waters, the other parched up by the heat of the sun. Some countries would be exposed to furious tempests, which would destroy every thing, while the inhabitants of others must be suffocated, as the currents of air would be retarded, if not entirely stopped. One part of the globe would enjoy the benign influences of the sun, while another must be benumbed with cold.

What pride and ignorance do we discover, if we do not acknowledge here the hand of the almighty and all-merciful Creator! Do we deserve to be inhabitants of a globe, where all is so wisely arranged, if, like the brute beast, we are inattentive to the admirable order, and ungrateful, while enjoying the innumerable benefits which result from it? O my God, and my Creator! let *me* never be guilty of such monstrous ingratitude. Full of astonishment and admiration at the sight of thy works, let us raise ourselves up to thee, and adore thy wisdom! Our weakness permits us to go no farther. Oh! how much should we desire to be capable of celebrating thee with the fervour of the heavenly choir! to contemplate, with a more enlightened eye, thy wondrous works, and to be no longer subject to deceive ourselves in meditating on thy sublime designs

But, thou kindly condescendest to accept the feeble efforts which we make to glorify thee. Though our knowledge be limited, and our praises imperfect, yet thou knowest they are sincere. One moment in the blessed abodes of the heavenly Jerusalem will enlighten us more than a whole century below. With what transport of joy should we meditate on this glorious state! Ah, Lord! how long shall it be, ere we arrive in those blessed regions where we shall get a more

On the short duration of the snow.

intimate acquaintance with thy works, and where we shall glorify thee, with all thy saints, throughout eternity ?

FEBRUARY XIII.

ON THE SHORT DURATION OF THE SNOW.

WE see the instability of the snow, and how soon the rays of the sun, damp and mild air, or heavenly showers, cause it to disappear from the earth. Often the appearance of surrounding objects is changed in a few hours ; and there is scarcely a trace left of that snow which covered the shrubs, villages, and fields. Is not this sudden revolution well calculated to make us reflect on the vanity and uncertainty of earthly possessions ? Certainly it is not without a wise design that nature presents us with such emblems of the frailty of terrestrial things. In all the seasons, and in all the variations which their returns bring, it preaches to us, with a vigorous and persuasive voice, this great truth : *All is vanity !* Let us contemplate the whole surrounding theatre of terrestrial objects. Can we discover any thing but what is frail and perishing ? How speedily we are deprived of the pleasures of sense ! They disappear when we just begin to enjoy them. Often at sun-rising we are contented and merry, yet before it sets, we are overwhelmed with melancholy and distress. Have we not all often experienced, in the course of our life, how uncertain and transitory earthly enjoyments are ! Riches, on which we value ourselves, often make unto themselves wings, and fly away as an eagle, and abandon their possessor, just at a time when he flattered himself he should enjoy them peaceably, and without interruption. The transition, from the greatest opulence to the greatest poverty, want, and misery, is often as sudden as the arrival of a thaw after the most intense cold. We might rest satisfied with this, if our life and health were not as frail as all other sublunary things.

Nevertheless, it is but too true, that such reflections as these affect us but little, while we are in possession of earthly prosperity. We resemble those, who, in a beautiful winter morning, venture to set out on a journey, without considering the sudden changes of weather which are common to this season. When fortune smiles upon us, and joy and pleasure surround us, we think we have nothing to fear, and do not consider how suddenly the most prosperous circumstances may be changed to adversity. And, supposing that we have not yet had occasion to prove this by sad experience, is it certain, that a time will not come, when we shall have the fullest conviction of the frailty and emptiness of all earthly things ? Are we yet in the spring or summer of life ? Let us remember, the winter will not fail to come ; and then shall we feel how transitory those possessions are on which we have reposed with so much confidence. We shall learn, that all

On the short duration of the snow.

sublunary pleasures resemble snow, which for a little while dazzles the eyes, but quickly melts and is no more!

But here is another important reflection, which the instability of the snow may lead us to make : it reminds us of our great weakness. What could all the industry and strength of men avail, if they endeavoured to free the earth from snow and ice ? But God brings about this change with infinite ease. He speaks, and suddenly the ice and snow melt away at his command. He orders the winds to blow, and the thaw takes place. Now, cannot that God, who does such great things in nature, manifest the same power in the world of spirits, and in the regulation of our concerns ? He has only to speak, and our troubles shall end, and all about us shall resume a smiling appearance.

FEBRUARY XIV.

AN EPITOME OF THE HISTORY OF CREATION.

THERE was a time when our globe, and the other heavenly bodies, had no being. God willed that they should exist ; and his almighty will produced the heavens and the earth. At first all was a confused and formless mass, which is commonly named *chaos*. On the *first day* of the creation, God communicated motion to this senseless mass, and separated the igneous and luminous particles. These particles, separated from other matter, became united together, without being, as yet, formed into any particular body. The light God called day, and the darkness he called night. Hitherto, the solid and fluid bodies were confounded together. God separated them, and collected the waters of our atmosphere ; he raised vapours from the earth, which condensing, became clouds, and formed the lower firmament, which we call heaven. This was the work of God on the *second day*. As the waters still covered the face of the earth, God employed the *third day* in separating them. The waters were collected in divers reservoirs ; whilst on the dry land, mountains, vallies, fields, meadows, and forests appeared.

Each tree at this time bore its peculiar fruit ;* and each plant and vegetable contained the seeds necessary for the propagation of its species. On the *fourth day*, God formed, from that mass of light which he had separated from the darkness, luminous bodies, which should serve for the distinction of day and night, and to regulate the vicissitudes of the season of the year. Then the sun appeared, whose fire and benignant heat warm and fertilize the earth ; and whose rays enlighten us during the day. The moon appears to have been formed of the opaque matter of the chaos. Hitherto, God had only formed inanimate creatures upon the earth : and the *fifth day* was employed in giving existence to a part of the animals. God replenished the waters with fish of different kinds and magnitudes ; giving them bodies ana-

logous to the element in which they were to live. He peopled the air with all kinds of fowls, and impressed upon their nature the instinct to perpetuate their respective species, and to fill the air and the waters. Nothing remained now, but to replenish the earth with living creatures ; and these God formed on the *sixth day*. He now formed, out of the earth, a number of wild and domestic animals, to serve not only for tillage, but also for the nourishment and support of man. Finally, he produced an infinity of insects and reptiles ; and all these animals, when created, were in their fullest perfection. All being thus prepared, the time came in which MAN, the lord of the creatures, should be introduced into the world ! God therefore created the first man, and as he appertained both to intellectual and material worlds, he gave him not only a body, which was formed out of the earth, but also a rational soul.

Of one of his ribs, during his sleep, he formed the *woman*, and presented her to him to be his companion. These two creatures, in formation of whom he terminated the works of Creation, were the masterpieces of his power and wisdom.

Can we reflect on this history, without being struck with astonishment and admiration at the view of the power, understanding, and infinite wisdom which are manifested in the works of creation ? In every part of this grand theatre to which we turn our eye, we discover the Lord God Almighty, to whose immense power nothing can be compared. The heavens declare his glory, and the firmament shows forth his handy works. All the creatures are so many proofs of his adorable perfections, and in some way or other bear his image and superscription. It is only by considering the creatures in this point of view, and by deriving these uses from the contemplation of them, that we can be accounted worthy inhabitants of this immense universe. And how is it possible to acknowledge the grandure and glory of God in the works of creation, without feeling our minds affected, and penetrated with the most lively sentiments of veneration, love, gratitude, and the most unlimited confidence ? These are objects worthy of our most profound respect, and most ardent love.

This is the fruitful source whence all that is beautiful, pleasant, and transporting in nature, derives its being. This is the Lord *our* God, who alone is worthy to receive our homage, praise, and adoration. This is the most rational and suitable employment ; an employment for which we were created, and to which all the creation invites us. If we obey our Creator ; if we endeavour to conform ourselves, in all our conduct, to those rules of wisdom and order which he has followed in the construction and arrangement of the universe, this will be the most acceptable praise : and if, filled with a filial confidence, we repose, without fear, on the tender care of that God who hath created us, this will be the greatest proof we can give of that veneration and respect which he requires of us. Let us earnestly pray that we may, by Christ Jesus, become children of our heavenly Father ; then shall we be naturally led to fulfil those duties which God requires of us.

Bodily advantages which the brute creation have over man.

FEBRUARY XV.

BODILY ADVANTAGES WHICH THE BRUTE CREATION HAVE OVER MAN.

WHEN we carefully examine the bodies of brutes, we discover various advantages which they have over us. First, their bodies are incontestably more compact, strong, and durable. The greater part of animals are capable of using their limbs as soon as they come into the world, of seeking their food, and of acting conformably to the instinct with which the Creator has endued them. They are not subject to those cruel maladies to which we are exposed, and by which our constitution is so often destroyed. And what a wonderful instinct, what sagacity, what address, do they manifest in their motions, and in the use of their senses ! How delicate is their sense of smelling ! How subtle and piercing is their sight ! What agility and swiftness in the motions of animals, whether they run or fly ! If we consider the astonishing structure of their organs, the admirable make, the noble and majestic figure of some animals, it will be found, that in regard to our bodies we have few prerogatives ; and that they have a decided advantage over us in various respects.

Some people complain of the lot of man ; and are discontented because God has not given him the swiftness of the fowls, the strength of the horse, the delicate smell of the dog, the penetrating sight of the eagle, and the agility of the stag. But it is only stupidity and ignorance which occasion such murmurs. If we knew the full worth of a rational soul, we should feel that we have the greatest advantages over other animals, notwithstanding their instinct and cunning.

Why has the Creator given to irrational creatures prerogatives which are peculiar to their bodies ? Why has he endued them with so much strength, with such exquisite senses, and with so much agility and address in their different motions ? Why has he endued them with such wonderful instincts, and given them so much sagacity in procuring their nourishment ? It can only be as a recompense to them instead of *reason*, and other human faculties which they want, and with which we are favoured. By the use of our understanding we can preserve ourselves from many maladies, and guard against many dangers : we may, by observing a proper *regimen*, or by having recourse to medicine, cure the sickness and infirmities of our bodies, or, at least, relieve them. By our intellectual faculties we may procure and enjoy a multitude of conveniencies : intercourse with others, together with social life, contribute, in a thousand ways, to our well being. Brutes are deprived of all these advantages, merely because they have not received the inestimable gift of reason. These inferior creatures would have been too unhappy, had not the Creator granted them some recompense for that intelligence which they are denied. On this account, he has been, in some sort, more liberal towards them than towards us, in the distribution of certain corporeal advantages. He has given them a construction, form, and senses, appropriate to

Bodily advantage which the brute creation have over man.

their different wants. He has given them a variety of instincts, industry, and an admirable sagacity, by which they can distinguish what is salutary from what is noxious, defend themselves, procure their own nourishment, and provide for their various necessities; advantages which we have not in the same degree, and without which we may be very well satisfied, seeing we have received privileges of incomparably greater value.

On this subject, we should admire the paternal care of a kind Providence towards men. It is for our sakes that God has formed the brutes with such admirable art. That they might be capable of rendering us more effectual services, God has endued them with so much strength, agility, and industry; with so robust a body, and with such exquisite senses. We should soon be subject to all kinds of inconveniencies, and be deprived of a multitude of considerable advantages, relative to our support and occupations, if these animals, whose daily service is so necessary to us, had been formed with fewer corporeal advantages.

Consider also, that the privileges which the brutes enjoy are limited to the present world; whereas we have been created for a better world, where our bodies, elevated to the highest degree of perfection, shall be freed from every kind of defect, and from all the wants to which they were subject here below.

FEBRUARY XVI.

THE MOON.

NEXT to the sun, the moon, of all the heavenly bodies, has the most salutary influence on our globe. And were it not in itself an object worthy of our attention, it would become such, at least, by the great advantages which it procures to our earth. A simple view of it, without the assistance of a telescope, will enable us to discover many phenomena in it. It is an opaque body, and the illuminated part is always turned towards the sun. The increase and decrease of its light are sufficient to convince us, that the moon is a round dark body, which borrows its light from the sun. In twenty-four hours, this globe turns round our earth, and finishes its own revolution in about twenty-nine days and a half. But what the naked eye may discover in the moon, is not to be compared to what may be discovered by telescopes and calculations. What obligations are we under to those enlightened men, who, to extend our knowledge, and to make the glory of the Creator more manifest to the eyes of men, have made inquiries and discoveries which enable us to form more exalted notions of the heavenly bodies! By means of their laborious observations, we know, at present, that the moon, which appears so small to the naked eye, is nevertheless a body of considerable magni-

The moon.

tude, considered in relation to the earth. Its diameter is 2364 miles, and is about fourteen times less than our globe. Although the moon, of all the planets; is nearest to our earth, it is nevertheless at the distance of 240,000 miles. On the face of the moon many spots are discovered by the naked eye. Some of these are pale and obscure; others are more luminous, according as they reflect more or less light. The bright spots are probably high mountains, which reflect the solar light from their ridges; and the obscure spots are either deep vallies, or fluid or transparent bodies, such as seas, which, conformably to their nature, absorb the greater part of the light, and reflect but a little.

These discoveries, to which no solid objection can be made, prove that the moon is not so inconsiderable a body as ignorant people imagine. The magnitude, the distance, and all that we know of this celestial globe, furnish us, on the contrary, with a new proof of the unbounded wisdom and power of our Creator. But can we suppose that a planet, so large as our moon, was intended for no other purpose but merely to enlighten our globe for a few nights? Could that body, which, according to all appearance, is similar to our earth, and which seems calculated to answer the same ends, be designed for no other purpose than to produce the flux and reflux of the sea; or, that it should procure some other advantages to the inhabitants of the earth, which are still unknown to us? Is it probable, that the surface of a body of some hundreds of thousands of square miles, should be destitute of living creatures? Would the infinite Being have left that immense space an empty desert? Certainly this cannot be consistent with the wisdom and goodness of God. Let us rather believe, that the Lord has established his empire in that planet, as well as among us. There, without doubt, are found an innumerable multitude of creatures, who adore, with us, the same Lord, and the same Father. Who are, as we are, the objects of his providential care; and for whose happiness God provides with the same goodness as for ours.

But, as knowledge, in this respect, is very imperfect, let us confine ourselves to the advantages which our globe derives from the moon. In this we shall discover the tender care of a wise Providence manifested in a very striking manner. He has placed the moon so near us, that it reflects more light upon the earth than all the fixed stars together. By this he not only affords us a pleasing object, but also a thousand conveniencies and advantages; for, by the light of the moon, we may undertake journeys, go wheresoever our necessities may call us, prolong our labours, and despatch much of our business, during the night. Besides, in what confusion and embarrassment should we be, in respect to the division of time, were it not for that regularity with which the phases of the moon succeed each other! It is true, that the calculations of astronomy save us the trouble, in this respect, of observing the variations of this planet; but none of the conveniencies which the use of almanacks afford us could exist, if observation had not been made on the course of the moon.

The moon.

Lord God Omnipotent ! I adore thy wisdom and goodness, in the light of the moon, as in that of the sun. The more I contemplate the heavens which thou hast formed, the more thy grandeur fills me with astonishment and admiration. Grant, Lord, that I may lift up the eyes of my understanding to thee, far above all terrestrial objects ! To thee, who hast created all these globes, and hast so wisely arranged them for our benefit ! Let the starry heavens which illuminate our winter nights, announce thy sovereign majesty, and the immense extent of thy empire ! O when shall I arrive in that blessed abode, where, with unveiled face, I shall contemplate the glories and wonders of thy grace !

FEBRUARY XVII.

RAIN MOISTENS AND FERTILIZES THE EARTH.

THE fertility of the earth depends principally on the humidity which it receives from rain, and other aqueous vapours. If the watering of the fields were left to the care of man, it would be an endless toil ; and in spite of all his labours, drought and famine would desolate the whole. In vain should men unite their strength ; it would not be sufficient to water what their hands had sowed and planted. They might drain out the wells and rivers, without being able to saturate the earth, and reanimate the vegetables, which otherwise would languish and die. How necessary then it is, that the vapours should be suspended in the clouds, and that afterward, by the agitation of the winds, they might descend upon the earth, and water both trees and plants ! Every shower enriches the earth, without which it would soon have a dismal and withered appearance. The treasures which the surface bestows so liberally upon us are, beyond all comparison, more valuable than all the metals and precious stones which its bowels contain. Civil society might very well subsist without gold or silver ; but not without corn, vegetables, and pasture.

Let us reflect on the inexpressible blessings which the rain produces on our globe. A timely shower renews the face of the earth ; and it has still more strength and influence than the dew, which, during the night, moistens the grass and the leaves. The furrows of the fields drink in greedily the refreshing rains which fall upon them. The prolific principles develope themselves in the seeds, and second the labour of the husbandman. The farmer labours ; he sows. he plants, and God gives the increase. Man does what belongs to him : and what is beyond his power, the Lord himself performs. In winter, he covers the seeds as with a garment : in summer, he warms and vivifies them by the rays of the sun, and by the showers. He crowns the year with his goodness ; and causes his blessings so to succeed each other, that men are not not only nourished, but have their hearts filled with joy and gladness.

Rain moistens and fertilizes the earth.

The divine blessing rests not only on the tilled land, but also on the fields and pastures of the desert. Even those countries which are abandoned by man, and from which no person derives any direct advantage, are objects of providential care ; and such is the goodness of God, that even the little hills and the mountains are girded with joy, and adorn themselves before us with smiling verdure. Psalm xlv. 12. The showers do not fall upon them in vain ; for though they do not produce fruit for our nourishment ; they are, nevertheless, vast reservoirs of water for our earth ; and they yield a great variety of wholesome plants and simples, good for the health of man, and serviceable for the nourishment of other animals.

Let us never forget the good which the Lord has wrought. How often, especially during the course of this month, does God water the earth by his showers ? But how seldom do we think, as we ought, on the greatness of his benefits ! Let us endeavour to consider its worth, and reflect, how all nature would be a gloomy and barren desert, if the heavens were as brass, and the earth iron ! All plants and trees would perish ; all living creatures would faint : we should respire death with the air ; and all rivers and brooks would be dried up. But as often as the showers water the earth, so often we receive fresh proofs of the divine goodness. And yet we complain and murmur, when the wintry rains are abundant, and of long duration ! We have even sometimes the rashness to censure the government of God ! Rather let us bless the Creator for every shower which he sends down upon our earth : let us feel and celebrate his goodness towards us. “ By his command the seasons are renewed, and follow each other in regular succession. For our sakes the rain falls upon and fertilizes the earth. God opens his liberal hand to do good to mankind. His blessing descends upon our fields, and diffuses peace and gladness around. Let us therefore adore the Creator, and sing to his honour hymns of praise and thanksgiving. What has he not already done for us ! and what may we not expect from his goodness ! ”

FEBRUARY XVIII.

WINTER PRESENTS US WITH EMBLEMS OF DEATH.

WE require continual warnings to induce us to think on the end of our days. It is natural for us to turn away our eyes from the prospect of death ; and were this not the case, there are many avocations, and many dissipations, which do not permit us to reflect on our end ; or which render the thought of death ineffectual. It is, nevertheless, necessary for our repose and comfort, to think frequently of this great event, that its terror may be diminished. In this respect the present season may be profitable ; we may consider as emblems of death, several objects which now present themselves to our eyes.

Winter presents us with emblems of death.

Nature is now deprived of that beauty and those charms with which it was adorned during the summer. The fields and gardens where we walked with so much pleasure, are now useless and deserted ; and retain nothing that can invite us to frequent them. The days are too short and too disagreeable to induce us to walk into the country. Is not this a striking emblem of what our life shall be, when we shall have attained the winter of our days ? Then, all the charms of which we were so vain in the spring and summer of life, shall disappear. Vexation, peevishness, and other infirmities, incident to old age, will not permit us to relish the amusements of youth. Our younger companions can no longer find any pleasure in our company : the short and gloomy days of old age must become burthensome : and if we act a rational part, our desires shall expand after a better life.

How short the days are at this season ! Yet it would be wrong to complain of this, seeing they are so dull, the earth being deprived of its ornaments. And as life in general is a continual struggle with sin and misery, is it not a blessing that God has shut up life within such a narrow compass ? The path that leads to heaven is short, but full of thorns : should we not be thankful to God for making it so short.

Several kinds of animals pass the winter in profound sleep, from which they do not awake till they have felt the gentle and vivifying heat of the spring. Thus, our inanimate bodies shall rest in the grave till, in the day of the last judgement, they shall be awakened from the sleep of death.

In winter, we are surprised by the night, which comes upon us in the midst of our occupations before we expected it. Perhaps, when we have purposed to finish such and such works, the evening comes, and suddenly interrupt our labours. Here again we may perceive a very plain emblem of the night of death. It will probably come when we least expect it. In the midst of projects which we have formed for the future ; in the midst of the most important enterprises, which we have determined to execute, this terrible death may surprise us. God grant that we may be then found in those occupations which may conduce to our everlasting happiness !

What is most melancholy in the winter nights is, that they are long, and that the sun does not speedily appear again.—And perhaps, what causes us to dread death so much is, that our bodies must be shut up so long in the night of the grave : but, just as the longest winter nights pass away imperceptibly in sweet sleep ; so insensibly will the night of death pass away, and the broad day of the new creation shall suddenly shine forth.

These are some of the edifying and useful reflections with which the winter may furnish us. Let us not be afraid to meditate often on the emblems of death : and let us endeavour to turn them to our profit. “ Let us familiarize ourselves to the idea of our latter end ; and let it be always present with us in every circumstance of life : then shall

Means to procure fire.

we be able to behold it without fear : it will be our comfort in affliction, a friend and faithful counsellor in prosperity, and a buckler against temptation."

FEBRUARY XIX.

MEANS TO PROCURE FIRE

IN the long winter nights, when the cold is intense, we find that fire is a benefit which we cannot too highly prize, and for which we cannot be too grateful. How gloomy and miserable would our life be in this season, if God had not given to fire the property of enlightening and warming our habitations : and if this element were not every where to be met with ! It is found in sulphur, in the fat of animals, in oil, in bees-wax, and in all vegetables, although it appear inactive, and that externally we perceive not its effects. But the collision of bodies discovers its presence, and proves that there must be fire diffused through every part of the atmosphere, which may be perceived between the points which come thus into contact. By the rapid and repeated friction of hard bodies, such as flint and steel, the fire which these contain is put into motion : and the particles which are detached from bodies thus violently agitated against each other, acquire a power capable of inflaming any thing. This is the most common method of obtaining fire, and our daily domestic necessities. But, we generally content ourselves with the continual services which this element renders us, whether for the preparation of our food, for warming us, or for illuminating our apartments, without taking the trouble of examining how it is produced.

Were we more attentive to the causes of certain natural phenomena, we should find traces of infinite wisdom and goodness every where. And surely it does not require any great effort of reflection to discover them here. It is with the most gracious design that God has diffused fire through all nature, that it might be at hand for every necessary purpose, and that we might enjoy its services on all occasions. This matter assumes every form in order to be useful to us ; and by associating itself with a multitude of other bodies, it procures us the greatest advantages. How well would it be, could we only habituate ourselves to be more attentive to the many benefits which we receive from the liberal hand of God ! But alas ! it is really their constant and daily return which renders us careless and indifferent. Nevertheless, these proofs which we receive daily from the bounty of God, are such as we cannot at all dispense with ; and which, on this very account, deserve particularly to be acknowledged with gratitude and joy. Let us think frequently on our wise and merciful Preserver ; and in the enjoyment of his benefits, even those which appear to us of least consequence, let us frequently raise our hearts to heaven, and acknowledge him as the source of all good.

Means to procure fire.

O Lord, how great must that goodness be, which is extended over the whole earth ! Thy love, like the light and fire, surrounds us every where. May we be deeply affected with it ! May it enlighten and influence our whole soul ! Heavenly Father, communicate to me some sparks of the fire of thy love, that I may reflect them upon my brethren, and that they, with me, may enjoy their blessed effects.

FEBRUARY XX.

THE EQUAL DISTRIBUTION OF THE SEASONS ON THE EARTH.

WHILE the sun appears at a distance from us, and the intense cold binds and locks up all our fields, there are countries whose inhabitants enjoy all the beauties of the spring ; others where they gather in the riches of harvest, and others where autumn fills their granaries with its fruits. Thus the Divine Wisdom has regulated the revolutions of seasons, and distributed to all his creatures the same favours at different times. His impartial love extends to all the creatures his hands have made, without regarding their rank, their nation, or their merit. It is sufficient that they need his mercy, for him to take pleasure in bestowing it. His beneficent regards are fixed with as much goodness on the deserts of Arabia, as on the smiling countries of Europe ; and his government is the same from pole to pole.

But if God distributes the goods of this life with equality, why does he deprive certain countries of the pleasures of spring, with which he favours us so abundantly ? Why does the sun diffuse his light so partially, that in some climates the nights, in others the days, last for whole months ? Why are not the icy regions about the poles as beautiful and as fertile as *our* plains and vallies ? Who art thou, O man, who darest to ask such questions ? What right hast thou to require the infinitely wise Being to give an account of his method of governing the world ? Proud mortal ! learn to humble thyself, and acknowledge the footsteps of an infinite wisdom even in those things wherein thy weak understanding can perceive nothing but defects. Perhaps, thou thinkest that Providence has denied certain parts of the earth those advantages and comforts which it has scattered, with so much profusion, over others. Not so : God has given to each country what was necessary for the life, nourishment, and happiness of the creatures which he has placed in it. All is arranged according to the climate where they live ; and in every place Providence has wisely provided for their preservation, and for the supply of their necessities.

The hours of the day vary, in different parts of the world, according to certain rules ; but all the zones have nearly the same number. There is scarcely any inhabited country which the sun favours longer with his presence than another. All the difference is, that they en-

 Equal distribution of the seasons.

joy it at different times. As to the inhabitants of the torrid zone, their days and nights are always of an equal length ; while the neighbouring zones possess this equality but twice in the year. It is true, that the sun quits them alternately, and gives summer to one part of the earth, while he abandons the other to winter. But he never fails to return annually from one limit of his course to the other ; and if, during the winter, the days are not so long as the nights, for this the summer makes an ample recompense. If even in the frigid zones, the inhabitants are deprived, for some months, of the light of the sun, they afterward enjoy it for nearly the same length of time ; and if they have a few hours less of day, they are amply recompensed by long twilights.

O Lord ! the earth is full of thy goodness. Thy righteousness extends to the heavens, and thy mercy reaches to the clouds. There is no country in the universe destitute of the proofs of thy love. There is no province of thy immense empire where thy kindness is not manifested. There is no creature, there is no man, which, in every season, may not taste and see that thou art good. I rejoice, because I live under thy beneficent government ! I rejoice in the innumerable blessings which thou hast scattered over all the earth for the welfare of thy creatures. Should not I wish that all my fellow-creatures throughout the world might live as happy, as tranquil, and as contented as myself ? Yes, thou knowest ; thou, my God, who searchest my heart, knowest that I am neither so envious, nor self-interested, as to feel distress at the welfare of others, or not to wish them blessings equal to my own. O God of love ! grant that we may become more and more like unto thee ! As thou lovest all thy creatures, and there is no respect of persons with thee ; as thou dost to each all the good it is capable of receiving, kindle in our hearts a love as universal towards our fellow-creatures, that we may do them all the good in our power ; and send up unto thee our most ardent prayers for the happiness of all mankind !

 FEBRUARY XXI.

THE USE OF OUR SENSES.

I HAVE senses ; that is to say, I am a being who, through the medium of several wonderful organs of my body, can procure myself a variety of sensations. By my *eyes*, I can acquire the perception of light and colours : by my *ears*, that of different sounds : by *smelling* and *taste*, that of agreeable or disagreeable savours and odours, of bitter and sweet, and other similar properties of the bodies I make use of. Finally, by *feeling*, I have the perception of hot and cold, wet and dry, soft, hard, &c. How miserable should I be, were I deprived of the organs of sight, hearing, tasting, smelling, and feeling ! If I had no *sight*, how could I preserve myself from the many

dangers which encompass me, or form a just idea of the magnificence of the heavens, the beauties of the country, and the many pleasing objects with which the earth abounds? Without the faculty of *hearing*, how could I perceive the many dangers which threaten me at a distance? How could I communicate my thoughts to others? and how could I enjoy the harmony and charms of music? How could I, in my youth, have acquired instructions at school, learnt languages, obtained ideas, the talent of reading, and so many other faculties which distinguish me so advantageously from the brute creation? Had I been deprived of the organs of *smelling* and *tasting*, how could I have distinguished my nourishment, or discerned the aliments which are wholesome from those that are injurious? How could I enjoy the perfume of the spring, and a thousand objects which now afford me so many pleasing sensations? Finally, without the sense of *feeling*, how could I have been capable of discovering either in my food, or when sleeping or awake, what might be injurious to me? And how should I be capable of watching over my own preservation? "I cannot, therefore, rejoice in, and praise my God too much, that I can see, hear, feel, and speak. I adore my beneficent Creator; I acknowledge and celebrate his bounty. My mouth shall glorify him in songs of praise and thanksgivings: and my ears shall be attentive to that universal hymn which all creatures sing to his honour."

May I never forget the value of my senses, or make a bad use of them! O my Creator! thou hast given them to me for the most noble purposes! How much should I dishonour thy liberal kindness, and the wonderful structure of my body, should I employ my senses only in animal functions, without proposing to myself more exalted views! How miserable should I be, if I sought my happiness only in the gratifications of the senses, and preferred this to the more sublime gratifications of the mind! For a time shall come, in which my eyes shall be no more affected with the beauty of exterior objects:—in which the harmonious sound of music shall no more please my ears: in which my palate shall no more relish the most exquisite viands, and the most delicious liquors.—A time shall come, in which my senses shall find neither pleasure nor satisfaction in terrestrial things. How miserable should I then be, if I possessed nothing that could nourish my spirit, comfort my soul, and satisfy my desires! Spirit of grace, so direct and lead me, that in the use of my senses I may not lose sight of the great end of my existence! Grant that those organs may serve to glorify my Creator; and that I may begin, here below, to habituate myself to those noble occupations in which I shall be employed in the kingdom of heaven!

At this moment, while I feel the happiness of having the proper use of all my senses, I should think of my brethren who have either their senses imperfect, or are wholly deprived of some of their organs. O ye blind, ye deaf, ye dumb! I cannot see you without deploring your lot, and without acknowledging, more than ever, my own

happiness! Why is it, O my God, that I am not classed with these unhappy people? How can I sufficiently testify my gratitude to thee for the perfection of my senses! Pity those, O God, who, through the deficiency of those organs, are deprived of so much consolation! If it be thy good pleasure, compensate them for these imperfections by other advantages; and give them power to believe in thee, and to expect, in the other world, a happy perfection of all that relates to both body and soul! Amen.

FEBRUARY XXII.

ASPIRATIONS OF THE SOUL TO GOD.

WHEN I give up my heart to God, I begin to answer the end for which I have been placed in the world; and enjoy a foretaste of that felicity which awaits me in heaven. How contemptible the vain amusements of the world appear to me, when my heart gets into the habit of seeking its happiness in God, through Christ! How humble and mean do I appear in my own eyes, when I compare my meanness with the infinite majesty of God! How is my natural pride confounded, when I lose myself, so to speak, in the ocean of the Divine perfections! and what ardent desires are there kindled in my heart for that happy day, when I shall be for ever united to the supreme and eternal Being!

But am I so affected with the inestimable advantages which frequent meditation on God affords, as to form the resolution to employ myself in it as I ought? Alas! instead of employing my spirit with great and sublime objects, I too often fix my attention on earthly and perishing things! Instead of finding delight in meditating on my Creator, I take pleasure often only in what gratifies my senses. Instead of serving that Being who possesses all possible excellence, and who alone can render me perfectly happy, I attach my heart to the earth, and become passionately fond of objects which can neither constitute my happiness, nor be long enjoyed. O that my past experience may make me wise for the time to come! Hitherto I have only loved temporal blessings, and set my heart upon them. I have sought my peace and happiness in things which are even more frail and perishable than myself.

But at present my eyes are opened, through the grace of God. I contemplate a Being, the source of all perfection, who has formed me out of nothing, and given me a soul whose desires cannot be satisfied but by an infinite good. This is the Being to whom I consecrate my heart, giving myself up to him without reserve, and for ever. In him alone I will henceforth seek my comfort. These earthly goods, which I have hitherto had the imprudence to prefer to heavenly blessings, I will exchange for real and solid advantages; and, seeing it is the design of my Creator, I will use the former, but without ever preferring them to the love of my God. On the contrary, every

 Aspirations of the soul to God.

creature shall afford me an opportunity to ascend to my Creator ; and shall excite me to bless the goodness of him, who has given a power to earthly things to cheer my soul, and strengthen my body. When I enjoy any outward good, I will say to myself, if I feel so much sweetness in the enjoyment of the good things of this life ; if, knowing only a small part of the works of God, that knowledge is now so pleasing to me, how happy shall I be when I possess God himself ! How great is the felicity of his saints, who see him as he is, and live continually in blessed communion with him ! If the pleasures which cannot be relished but through the medium of a frail, perishable body, can affect my mind so agreeably, how ecstatic must those delights be which I am to enjoy without the encumbrance of this earthly tabernacle ! What ineffable sensations shall I experience, when my spirit, freed from its fetters, shall be able to contemplate, at full liberty, the face of the Lord ! If the small rivulets here below are so pleasant, what must the source be whence they flow ? If one ray of light be so vivifying, what must the sun himself be ? If, even in this world, God is so admirable in his works, what must he be in the world to come ! Oh ! how I long to enjoy this felicity in the possession of my God ! Run rapidly by, ye days of darkness, which I must pass here below ! Ye hours, which retard the happy moment in which I shall gain a more perfect knowledge of my God, hasten your flight ! O day, without clouds or darkness, in which my soul, freed from the burthen of this gross body, shall take its flight, and ascend beyond all these stars, to adore Jehovah at the foot of his throne, blessed day, so earnestly desired, hasten thy appearance !

 FEBRUARY XXIII.

CAUSES OF HEAT AND COLD.

WHENCE proceeds the transition from extreme heat to the most intense cold ? By what means does nature bring about these revolutions ? It is indisputable, that the temperature of the atmosphere during the winter depends on the situation of the sun. For when our globe, in its annual course round the sun, is so placed that its northern hemisphere is turned away from it, so that its rays fall in a very oblique manner on those parts ; and when the sun is but a few hours above our horizon, it is impossible that these rays should produce much heat. But the heat does not entirely depend on the situation, or distance of the sun. That luminary passes annually through the same constellations : and is not farther from us in one winter than in another. Nevertheless, the degrees of cold in our winters, are very different. Some winters are as mild as autumn ; in others, deep seas are frozen up ; and men and other animals find it difficult to defend themselves against the cold.

Causes of heat and cold.

Even in those countries where, during the whole year, their days and nights are nearly equal, the heat of the sun is not strong enough to dissolve the snow on the tops of mountains. The most intense winter reigns on their ridges, whilst the most scorching summer prevails at their basis, although the same rays fall equally on the ridges and basis of these mountains. Were the sun the alone cause of heat and cold, the phenomena would be inexplicable.

Nature is rich in expedients ; and a thousand causes which are perhaps unknown to us, second her operations. But we know, at least, that the constitution of the atmosphere, and the winds, have a great effect on the heat and cold of a country. Hence it is, that sometimes, in the longest days of summer, it is cold, when the atmosphere is laden with thick vapours ; when the sky has been, for a long time, covered with clouds ; and when the north wind blows strongly. Hence, even in winter, the cold is sometimes not so intense, when the south wind brings us a warm air. The soil of a country contributes much to its coldness or warmth. For instance, in Siberia, where the earth is full of nitre, and different salts, it is always colder than in countries nearer to the pole, and where the rays of the sun fall more obliquely. The natural warmth of the earth, and internal heat sometimes, cause great variations in the temperature of the air in different countries.

These causes, and perhaps many more unknown to us, occasion the vicissitudes of heat and cold upon the earth. But who can understand all the springs of the great machine of the universe, or explain their different effects ? The greater part of the phenomena puzzle and confound us ; and we are obliged to acknowledge, that all the sagacity of the most eminent philosophers is incapable of penetrating the depth of nature. We see but a part, and, perhaps, the smallest part, of its operations ; and it is certainly for wise reasons, that the Creator has hidden from us the causes of so many effects in the kingdoms of nature and providence. He designs by this to teach us to contemplate ourselves. What would it avail us to have the most accurate knowledge of nature, if we neglected the knowledge and sanctification of our own hearts ? We know enough of nature to be happy, wise, and contented. Perhaps a greater knowledge of it might puff us up ; perhaps it might disturb our repose, and cause us to forget God. Let us endeavour to make a good use of the little we know, that we may the better glorify the Supreme Being, by becoming more holy. If, after all our researches, and all other meditations, many things still remain veiled from our eyes, let us draw this conclusion from the whole, that the wisdom of God surpasses all our conceptions ; that *it* is infinite, that our understanding is limited. And thus, under a conviction of our weakness and insignificancy, we shall feel it our greatest duty to humble ourselves, and to adore the Most High.

FEBRUARY XXIV.

SINGULARITIES IN THE MINERAL KINGDOM.

IT would be difficult, not to say impossible, for our weak and contracted understanding to comprehend, at once, the whole empire of nature ; and to conceive, at once, the whole detail of the wonderful properties of natural things. We shall arrive more easily at this knowledge, if we begin with certain detached objects, some particular beauties ; and employ ourselves first with the more sensible phenomena. Let us consider, at present, some curiosities of the mineral kingdom ; and we shall discover in them, as every where else, proofs of the infinite wisdom of God.

Among stones, none merits our attention more than the *loadstone*. When suspended, it turns itself so that it constantly points north and south ; and in those two ends which we call its poles, its greatest attractive virtue resides. What is very particular is, it attracts nothing but iron. If we take two *loadstones*, we shall find that the two opposite poles, viz. the north and south, attract each other : whereas, the poles of the same denomination, viz. the two south, or the two north poles, repel each other.

We find properties in *quicksilver* equally wonderful. It will assume any form you please ; but it always ends by resuming its own natural one. In the fire it rises up in vapours ; and, when it is shaken a long time, it changes into dust. By being dissolved, it may become a hard and transparent crystal ; but it can easily be restored to its former fluid state.

Gold is the first and most precious of the metals : not only because it is heaviest, (*platina* excepted) but because of its wonderful properties. It is the hardest and most unalterable of all bodies ; so that it can stand the action of the hottest fire for months together, without any change in its nature, or the loss of the smallest portion of its weight. Its particles are so fine, that one grain of gold may be beaten out so as to cover 50 square inches ; and the naked eye may discover, on the two surfaces thus covered, four millions of particles. Its ductility also is such, that one grain may be drawn out into a thread 500 feet long, and is divisible into 23,400,000 parts perfectly distinguishable by the eye.

The wonderful form of *common salt*—brilliant stones—singular figures of earth where metals are hidden—petrified bodies, which are often found on the highest mountains, some hundreds of miles from the sea, where they had their origin—and a hundred other singularities of the mineral kingdom, seem to be formed to waken our curiosity.

No occupation whatever has so many charms ; is so satisfactory, or affords more diversified pleasures, than the attentive contemplation of nature. Supposing we were to live some centuries upon the earth, and that we should employ each day, each hour, in the study

of the singularities and phenomena of the mineral kingdom ; even at the end of this time, there would be found a thousand things which we could not explain, which would still be hidden from us, and which would excite our curiosity more and more. But, as the duration of our life scarcely extends to half a century, let us employ a little of that time which is granted unto us, and consecrate it, as far as our other duties will admit, to the observation of nature ; and thus afford our minds the most durable and innocent pleasure. The satisfaction which we shall find in it will increase more and more, in proportion as we take care to meditate on the designs which God proposes to himself in his works ; for the works of nature are incomparably more wonderful and sublime than all the productions of human art. These do not always promote our welfare, or render us better : often they are only the objects of a fruitless admiration. But all the works of nature, even the most singular, have for their object the universal good. They exist, not only to be seen, but also to be enjoyed. And all, without exception, proclaim the goodness, as well as the wisdom, of God !

FEBRUARY XXV.

DAILY AND EXPERIMENTAL PROOFS OF DIVINE PROVIDENCE.

DO we wish to enumerate the blessings we have received from the mercy of God since the first moment of our existence to the present time ?—Can we count the stars ?—Can we number the blessings which we have received even in a single year ?—How then can we enumerate those which God has heaped upon us in the course, perhaps, of a long life ? How many mercies have we received in our infancy, which are now forgotten ! Nights passed quietly in sweet sleep ; food by which our bodies have been refreshed and strengthened ?—From how many dangers, seen and unseen, have we been delivered ! How often has God provided for our wants, and confounded our unbelief, which considered the relief impossible ! In every accident, the eye of God has watched over and preserved us. Every day of our life has increased the sum of God's mercies to us. His goodness is renewed to us as often as the sun begins and ends his daily course. And who can tell how often God has granted him mercies, of which he is still ignorant, and preserved him from perils which he knew not of, and of which he can only be informed in the world to come !

And, what shall we say of the blessings of grace ? We have been redeemed by Christ Jesus : the way of salvation is made plain to us by his Gospel. What a mercy it is, that we have not been born in the darkness of Paganism, but in the light of Christianity ! and that God incessantly labours to sanctify and perfect us in love ! Are not all these proofs of his goodness, and of his tender compassion ?

Daily proofs of divine providence.

Taking it for granted that it is impossible for any one to calculate the immense series of God's mercies during the course of his life; let us confine ourselves to a single day, and endeavour to sum up the blessings which one day brings with it. Light, air, food, strength to labour, the house we dwell in, the relations on which our happiness depends, the different amusements, and varied pleasures of life. Let us not forget the power by which we respire, nor think it a matter of little consequence. On respiration the preservation of our life depends. We respire, at least, *twelve* times in a minute: then, each minute brings *twelve* blessings, each of which is so essential, that without it, we could never receive another. With respiration, God preserves our understanding, will, and the several members of our bodies. Let us suppose, that in each minute our soul performs only thirty operations, and only reckon, according to the calculations of physicians, 6000 different parts in our bodies, which God every moment supports; and what wonders of preservation do we not discover! For, according to this calculation, we receive every minute from God 12 blessings relative to respiration; 30 relative to our understanding, and will; and 6000 relative to the different parts of our bodies: consequently, God grants us each minute, 6042 blessings, which will amount to 362,520 every hour of our life!

May these daily proofs of the providence and goodness of our God, make the deepest and most durable impression upon our hearts! and they certainly will, if our souls be susceptible of gratitude at all. Yes! if we have any adequate sense of the greatness of God's mercy, and our own unworthiness, it is impossible that we should not feel the most lively gratitude to the Preserver of our life.

But, in order to maintain a lively sense of God's benefits in our hearts, let us often endeavour to compute them. The more we employ ourselves thus, the more we shall be disposed to magnify the Lord our God, and the more shall we be delighted in celebrating his praise!

FEBRUARY XXVI.

TRANQUILLITY OF THE NIGHT.

HOW can we think, without admiration and gratitude, on the tender care of Providence to secure our repose during the absence of the day? As soon as night comes on, a calm is diffused over all nature, which proclaims to all creatures a rest from their labours, and invites man to sleep. During the time that men sleep, nature, in their behalf, suspends noise, vivid light, and all such impressions as might keep the senses in action. The animals, whose activity might disturb our repose, have themselves need of rest. Birds seek their nests, the ox, the horse, and our other domestic animals, sleep around us.

Tranquillity of the Night.

But this tranquillity of the night is not equally pleasing to all. Many, who through pain, sickness, and other accidents, pass sleepless nights, wish this melancholy silence interrupted. Their sufferings and uneasiness increase, while others are asleep around them; they count the hours, and long for the day, in hopes that society will bring them some relief. Many wicked people, who pass the day in continual riot and dissipation, find the tranquillity of the night tedious and troublesome: it awakens their conscience, and the least noise terrifies them.

Let us praise the Lord for granting us the pleasing and refreshing repose of the night. If we enjoy health of body and peace of mind, our sleep will be sweet. When we have gone through the labour of the day, the arrival of the night should cause us to adore that goodness which has disposed every thing so well to procure us a comfortable repose. *We* lie down in tranquillity, while thieves arise to walk in the dark paths of injustice and rapine. *We* sleep in peace, while so many sick persons, stretched on beds of misery and distress, long for sleep, and would esteem the shortest slumber a great favour, but cannot obtain it. *We* enjoy refreshing sleep, while the glutton is surcharging himself with meat and drink, the miser tormenting himself with anxious cares, and the fear of one day lacking the necessities of life; while the discontented and ambitious man ponders in his mind schemes of elevation and grandeur for the remotest period of life.

But how often is the tranquillity of the night interrupted by levity or wickedness! the drunkard's song, and the furious joy of the libertine, often disturb the repose of peaceable citizens, and deprive them of the blessings of sleep. Ought we not to esteem that order which God has so wisely established in nature, so as not to disturb it by the levity of our hearts? Ought we not so to love our fellow creatures as not to deprive them of that sleep which is necessary, not only to their health, but to their life itself? Alas! this ill-timed noise may, in one place, disturb a dying person; in another, affright a woman in labour; or terrify a mother who is suckling her child.

The rest which we expect in the grave will be very different; there we shall sleep in peace, and shall not be awaked out of slumber, till the voice of the Judge calls us into life. "How happy are the believers whom death has conducted to God! They have escaped all the miseries to which *we* are still subject in this world. Here the most comfortable life is spent in alternate hopes and fears; and our repose is disturbed by innumerable pains and anxieties. The righteous, on the contrary, whose bodies rest quietly in the grave, are delivered from all misery and care; sorrow or pain shall never more embitter their joy."

Winter is an emblem of life.

FEBRUARY XXVII.

WINTER IS AN EMBLEM OF LIFE.

IN these winter days there are continual changes. Flakes of snow, and showers of rain ; storms and calms ; cloudy days, and a clear sky, succeed each other. The snow has no sooner covered nature with its splendid garb, than the rain comes and destroys it. Scarcely has the sun shown himself, when he again disappears. And are there no similar variations in the moral world ? If many of the winter days are dark, tedious, and dismal ; many scenes of our life are equally so. But, as tempests and darkness are necessary, and conformable to the wise laws of nature ; it is the same with the disagreeable occurrences and the adversity, which we sometimes meet with in this world.

Who can prevent the day from being obscured by dark clouds ; or our happiness from being disturbed, sometimes by men, and sometimes by accidents ? Is it possible that the sky should be always calm and serene ; or that our minds should enjoy an uninterrupted repose ? The present constitution of our nature will as little admit of our being always free from grief and disagreeable sensations, as the constitution of the corporeal world will admit of the air never being loaded with clouds. Passions, which sometimes produce good effects, but oftener bad ones, are precisely the same in the moral world, that tempests are in nature. And, as the winter and its fogs are a source of fertility ; so also sufferings and afflictions are often the means of acquiring wisdom and virtue. Darkness shows us the value of light : a continual brightness would dazzle and fatigue our eyes. A clear day never gives us so much pleasure, as when cloudy and gloomy days have preceded it. In like manner, we should not properly value health, if we were not taught its worth by the painful experience of sickness. The excellence and advantages of friendship would never have been so fully known by us, if we had never met with false and deceitful friends.

After all, it is certain that we are too apt to exaggerate our evils : the events of the world, and the accidents which happen to us, are rarely so afflictive as we describe them. Our self-love, our pride, and our extreme delicacy, blind us to such a degree, that we account all unpleasant occurrences as real and considerable evils ; whilst, on the contrary, we take little notice of our real advantages, and the sweets which attend us through life. It is nevertheless certain, that all our troubles should be esteemed nothing, in comparison of the multitude of blessings and pleasures which are dispensed to us by the Divine Providence. And even those miseries of which we complain, would become real, though disguised benefits, if we knew how to make a proper use of them, according to the precepts of wisdom ; just as the snow, the tempest, the frost, and the changes of the present season, are the very means which God employs to bestow new favours upon us. When the sky has been a long time gloomy ; the clouds must finally disperse, and calm weather and sunshine bring back joy and

Winter an emblem of life.

gladness. The heavier the showers are, the sooner the clouds are drained : the darker they are, the sooner the rays of the sun disperse them. Adversity occupies but a small portion of our life ; and when it appears the most oppressive ; when we think we are about to be overwhelmed by it, it is a proof that it is near an end.

I will therefore receive, without murmuring, that portion of affliction which it shall please God to allot me. I should be very unreasonable, if I required pleasure, and days of happiness only. No, my Lord, let rain and the rays of the sun, darkness and light, alternately succeed each other during the course of my life ; I hope to be resigned to it. And, if thou shouldest think proper to shake my heart with the storms of adversity, thy will be done ! "What matters it, that the cup which is presented to me be more or less bitter ; that my troubles be more or less durable, while I am on this side the grave ; I know in whom I have believed : I know, O my God, that thou wilt one day bring me to thy eternal glory. Those who sow in tears, shall reap in joy. When the short sufferings of this life are passed away, I shall see how advantageous they have been ; and shall bless God for having taken me through much tribulation into the kingdom of heaven."

These considerations will support me under my afflictions. As the expectation of the spring renders the melancholy appearance of winter tolerable, the pleasing hope of eternity shall encourage me to bear, with resignation and courage, the sufferings of the present life. Through the darkness of this life the delightful prospect of a happy futurity opens to my view. What I already see of eternity, casts some rays of light on the path in which I walk : and thus I shall arrive, imperceptibly, at the blessed abode of rest, light, and joy.

FEBRUARY XXVIII.

THE UTILITY OF MOUNTAINS.

WOULD it not be of more advantage to our globe, were the surface more even ; and were it not disfigured by so many enormous mountains ? We have sometimes thought, if the form of the earth had been more regular, had its surface been but one vast plain, that our sight might have extended further, we should have travelled with much more convenience, and have enjoyed a hundred other advantages. But we are probably deceived in thinking thus. Let us endeavour then to discover the truth, and reflect on the utility of mountains, to see whether we have any reason to be discontented with the present arrangement of our globe.

First, It is evident, that from mountains and hills those springs flow, which are produced either by abundant snows, or by the clouds with which their tops are always covered : and it is these that feed brooks and rivers.

Utility of mountains.

2. Those ridges of high mountains, which extend from east to west over a vast track of country, serve to prevent the dissipation of the vapours, and to condense them into water. They are therefore as so many alembics, which prepare and purify the water for the service of men and beasts ; and by their declivities they give a moderate fall to the springs, which flowing thence, water and fertilize the vallies. 3. Besides this inestimable advantage of fountains and springs which mountains afford us, there are many others not less remarkable. They are the habitations of various kinds of animals, which are of great use to us. 4. They furnish, without any expense to us, nourishment and support for a multitude of beasts which are very profitable to us, both by their flesh and by their skins. 5. An innumerable multitude of trees, plants, herbs, and medicinal roots grow on the sides of mountains, which we cannot cultivate in our plains ; or which, if cultivated there, would not possess the same virtues. 6. In the bowels of mountains, metals and minerals are formed ; the generation of which could not be so well carried on in a low and level country, where they could not find a sufficiency of moisture.

7. Mountains serve also to shelter us from the cold and piercing blasts of the north and east winds. They are the fosterers of the most exquisite vines, their bowels contain precious stones ; they are, so to speak, the bulwarks of nature to preserve us from the fury of the winds and the waves : and like ramparts and natural fortifications, they defend many states from hostile invasion, and from the ambition of conquerors. 8. Probably, they preserve the equilibrium of our globe ; but however this may be, they are a species of amphitheatres, which afford us the most delightful prospects, and are to houses, and even whole cities, the most delightful situations.

It is true, that some mountains are formidable and dangerous : they occasion terrible earthquakes and volcanoes, which scatter flames and desolation around. But we should consider, that as sulphur, nitre, and other minerals, not only contribute to the fertility of the earth ; but are also necessary to the life of all sorts of plants, it was requisite that there should be a kind of universal magazine where these materials might be deposited, that they might be distributed by the air and winds over the surface of the earth. And, although they may be the cause of some inconveniencies, yet these can furnish no reasonable objection against the wisdom and goodness of God ; seeing the good they produce is infinitely beyond all the evils which can result from them.

In this respect, we have no cause to complain of the formation of our globe. Were there no mountains, we should be deprived of many useful stones and fossils : there would be neither rivers, fountains, nor lakes ; the sea itself would become a stagnated marsh ; we should be entirely destitute of a great number of the most beautiful and wholesome plants, and many species of animals ; and the privation of one of these things, might render our life gloomy and misera-

 Utility of mountains.

ble. Let us, therefore, conclude, that mountains, as well as all other creatures, announce the wisdom, power, and goodness of the Most High.

Lord God almighty! we adore thee, and acknowledge, with the most profound veneration, the wonders of thy wisdom! All that exists, all that thou hast created, from the smallest particle of sand to the highest mountain, all is well combined, all is in harmony, and all is pregnant with advantages to mankind. On the heights, as well as in the depths; on the mountains, as well as in the vallies: above the earth as well as under it, thou showest thyself the glorious benefactor of thy creatures. O Lord our God, we will bless thy name for ever and ever!

 FEBRUARY XXIX.

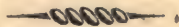
MOTIVES FOR CONFIDENCE IN GOD.

WHEN I reflect on the infinite perfections which manifest themselves in the arrangement of the universe, and in the manner in which God conducts and governs the whole, my confidence in him must necessarily increase, and be strengthened more and more. How satisfied should I be concerning my lot, seeing it is in the hands of this great Being, of whose power, wisdom, and goodness, I have as many proofs as there are creatures before me! What wishes can I form for my happiness, which cannot be fulfilled by this God, whose unbounded power has drawn so many thousands of worlds out of nothing? Can I be in any trouble, embarrassment, or perplexity, from which I may not be happily delivered by that infinite wisdom, which has stretched out the heavens; and which has formed all creatures in so wonderful a manner? Who can prevent my casting my burthen upon the Lord? Who can hinder me from having recourse to him, in all my troubles and distresses; or from hoping that he will hear my prayer? It is true, I am a very weak creature; I lose myself in the immense multitude of his works: and when I meditate on his grandure, and the infinite extent of his government, I often say to myself: "Who am I that I should dare to hope that this Supreme Being will always condescend to hear *me*? or that he should fix his attention upon me as frequently as my perplexities oblige me to have recourse to him?" But, on the other hand, I console myself, that his greatness, his majesty, and the government of so many thousand worlds, do not prevent him from extending his cares to the very least worm: what then should prevent his paying some attention to me, who, little and weak as I may be, have received from him as a man, and as a Christian, prerogatives so much superior to those of all other creatures.

But my conscience stops me here, and objects, that I am a sinner: that I have a thousand, and a thousand times wilfully transgressed the commands of my Creator and Master; and am consequently more un-

worthy of his kindness than the most abject creatures ; for they have not offended him, and could never be guilty of iniquity against him. My conscience also paints the justice of God in such strong colours, as all his works do his power and goodness, that it causes me to fear he will employ this power to make me a terrible example of his vengeance in the sight of the whole world. And, it is true, that in the whole creation, let me turn to whatsoever side I may, I can find nothing that can deliver me from these terrible thoughts, tranquillize my disturbed heart, or give me a well-founded subject for consolation.

But here the saving truth of the Gospel comes to my assistance. Eternal praises be rendered to thee, O my loving Redeemer ! Those views of God, which, without thee, could bring only trouble and distress into my soul, are become, through thy sufferings and death, a source of consolation and joy. It is through thee alone that I can look up to this God, whose grandure and magnificence all creatures proclaim ;—that I can, I say, consider him as my Father, put my confidence in him, and expect happiness from him, not only in this life, but also in the world to come. Now, the world appears to me in all its beauty. What a ravishing prospect opens before me ! If the earth be full of the goodness of the Lord, heaven will be infinitely more so. It is there that I shall be completely satisfied with the blessings of his love ; there, his infinite wisdom shall appear to my eyes, in all its splendour ; there, with a more penetrating, and better eye, I shall be able to fathom the wonders of the creation ; contemplate more nearly, the grandeur, pomp, and beauty of so many other worlds, of which, through the weakness of my sight, and the imperfection of my understanding, I can at present take up a transient glance. Then, my heart shall be filled with sentiments of veneration, love, and gratitude. Then my mouth shall celebrate, in the noblest accents, the everlasting praises of my Creator. Lord, thou art worthy to receive glory, honour, and power ; for thou hast created all things, and for thy pleasure they are, and were created.



MARCH.



MARCH I.

AN INVITATION TO CONTEMPLATE GOD IN THE WORKS OF NATURE.

O YE who with me adore the Lord, by whom the heavens and the earth were made, come and consider his works ; behold the wonders he has wrought ; and acknowledge his kindness with heartfelt gratitude. This, of all the knowledge we can acquire, is the most

important, the most pleasing, and the most easy. We could well dispense with many sciences which we take pains to learn ; but the knowledge of God and his works is absolutely indispensable, if we wish to fulfil the design of our creation, and secure our present and eternal felicity. Doubtless, we do well to seek to know God, as he is revealed to us in his divine word : but we cannot well embrace this revelation with full conviction of heart, unless we join to it that other revelation, by which he manifests himself in nature, as the Creator of all that exists ; as our Lord, our Father, and our Benefactor. This is a good preparation to know and receive the Gospel of Christ. Hence the divine Redeemer, when instructing his disciples in the truths of his religion, spoke often to them of the works of nature, and made use of those objects which the natural and moral world presented to him ; and to lead his hearers to the contemplation of spiritual and celestial things.

In general, it is a noble employment, and highly becoming man, to study the book of nature ; and to learn from it those truths which proclaim to us the immense grandeur of God, and our own littleness ; his benefits, and the obligations they lay us under. It is always disgraceful to man to be inattentive to the wonders which every where surround him ; and to be as little affected by them as the beasts that perish. If we have been endued with reason, it is that we might use it to God's glory, by examining his perfections in his works. And what more agreeable employment can the human spirit have, than to meditate on the admirable works of the Most High ; than to contemplate in heaven, in earth, in the waters, in the day and the night, in a word, in universal nature, in all that exists, the wisdom, power, and goodness of the Creator and Preserver ! What can we conceive more delightful than to discover, in all the creation, in all the kingdoms of nature, in every thing that presents itself to our view, the footsteps of Providence ; and the tender care of the Father of all beings ? There are no amusements, no worldly joys, of which we are not soon tired : but the pleasure which is tasted in the contemplation of God's works is always fresh, always new. And, though we should meditate thousands of years upon God and his works, our spirit would be so far from being fatigued with the subject, that, on the contrary, we should ever find new charms in it. And in this light it is that I often represent to myself the felicity of the saints in heaven. I ardently long to be among them, because I am persuaded that it is among them, in commerce with the blessed, that the insatiable desire to grow in wisdom, and constantly to acquire new ideas, can be fully gratified.

But whilst we are at a distance from this happiness, let us endeavour at least to come as near to it as possible, by habituating ourselves now to what the employment of angels and glorified saints shall be through all eternity. Let us adore God in his marvellous works ; let us endeavour to know him more and more : let us reflect on his greatness, admire his power and wisdom in each of his crea-

Invitation to contemplate God in the works of nature.

tures ; and consider, in every season of the year, his tender concern for all that exists. This employment will tend to make us not only the most happy, but the most virtuous of men. For if we have God and his works constantly before our eyes, with what love and veneration for him shall we be penetrated ; with what humility shall we serve him ; with what confidence shall we trust all we have in his hands ; with what zeal, and transports of joy, shall we sing his praises !

O God ! who art so worthy of all our homage, may we henceforth incessantly contemplate, with gratitude and admiration, the wonders of thy wisdom and power with which thou hast filled the universe ! May we, on the ladder of created being, mount from earth to heaven, to know and taste how good thou art ! Let all that is within, all that is without us, serve to lead us unto thee, the first principle of all things ; and may every thing contribute to inflame our love and piety more and more ! These, O heavenly Father, are the engagements we should enter into in the face of heaven and earth ; in the presence of all the creatures thou hast formed. The sun which enlightens us, the air which we breathe, the earth which feeds and sustains us, universal nature, which thou hast so wisely ordained to satisfy our wants, and to give us pleasure, shall one day rise as witnesses against us, if we neglect to contemplate and admire thy works.

MARCH II.

BAD WEATHER.

NATURE is yet deprived of her ornaments ; her aspect is wild and dismal ; the sky is covered with thick clouds ; and the atmosphere is loaded with snow and thick vapours. The mornings are wrapped up in impenetrable fogs, which deprive us of a view of the rising sun : just as he has shown himself, gloomy and stormy clouds arise, and prevent the earth from feeling his benign influence. How little warmth does he give ! Scarcely an herb dares to show itself above ground : all is still dead, without elegance, without charms.

“ When shall the lovely spring appear ? When shall those fine days arrive when the first flowers shall invite us to visit the fields and gardens ? ” Doubtless, many use this kind of language, and bear impatiently the gloomy days of March. But let us consider, that this very temperature of the air which afflicts us, contributes to the perfection of the whole ; and enters into the plan of that government which God has marked out. Were it not for these days, which appear so disagreeable to us, all the hopes which we have of summer would vanish away. Tempests are blessings in nature ; and the frosts are the means which she makes use of to fertilize the earth. If the air were at present more moderate, and the days finer, millions of insects would be hatched, which would be very injurious to the seed

Bad weather.

already sown, and to the buds of flowers. To what injuries also would those buds be exposed, which mild weather brings forth, should there afterward come any frost? But such is our ignorance and blindness, that we murmur against God, when we should bless and adore him: and we consider those things as imperfections, which should cause us to acknowledge the wisdom and goodness of our Creator. In general, we know not what we ask, nor what we wish: and to punish us sufficiently for our indiscreet and unreasonable prayers, God has only to grant them.

If the spring *now* displayed all its charms, how many of the following days would lose all their excellence? How soon should we be weary of rain, and how speedy the transition would be from intense cold to extraordinary heat! and how injurious this to our health! It is a blessing of God, a blessing of which, with many others, we are regardless, that spring comes imperceptibly. Its delay keeps us in a most pleasing expectation; and our satisfaction is the greater when it comes. The rough and stormy month of March, is the remains of the severity of winter; it prepares us for the enjoyment of fine weather: and it is the forerunner of that delightful calm which the spring diffuses over our fields.

Therefore, O God, I will exalt and bless thee in these stormy days; I will persuade myself more and more that thy government is both wise and good. I rejoice, that in all times, and in all seasons; in storms and in calms; in snows and in rains, as well as in the finest weather, *thou* art invariably my Father, my Preserver, and my Benefactor. The present uncomfortable days will, in a short time, be succeeded by the lovely days of spring. After all, I cannot reasonably expect to have only fair and pleasant hours in this world: my whole life is like the present season; and what, in fact, is life, but a continual vicissitude of pleasant and disagreeable days?

MARCH III.

THE ESTATE OF CERTAIN ANIMALS DURING WINTER.

AT present we do not see one of those insects or birds, millions of which live during the summer, in the air, on the earth, and in the water. At the approach of winter, they retire from our climate, the temperature of which no longer agrees with them; and in which they can no longer find proper nourishment. The first stormy day is the signal which obliges them to cease from their labours, and to quit their homes. We are mistaken, if we imagine that the winter destroys these animals: even in that season they continue to live. Providence takes care that none of them shall perish. The bodies of some animals are so formed, that the same causes which deprive them of their aliment, make such changes in them as render nourishment unnecessary. The cold benumbs them, they fall into a profound sleep, which continues

State of certain animals during winter.

till the returning warmth opens the earth, and causes the things necessary for their support to spring up : then they awake from their sleep. These animals hide themselves in the sand, in holes, in bottoms of ponds, in marshes, where they cannot be found out, nor their repose disturbed. In such places, their state is a species of death, or, rather, a kind of swoon ; nor are they reanimated, till the gentle heat of spring penetrates into their retreats. Some sorts of birds, at the approach of winter, undertake long journeys, to seek, in other climates, a more temperate air, and suitable food. Some fly in flocks from one country to another ; many go into Africa, crossing the Mediterranean Sea, and return to our countries in the ensuing spring.

Lord, how admirable is thy wisdom ! how tender and beneficent thy care toward the least of thy creatures ! Thou hast impressed on the mind of certain animals that wonderful instinct which informs them of the day in which they should abandon their summer residence, in order to pass the winter in a more favourable clime. Thou hast pointed out to others where they may securely pass the night of winter in deep sleep ; and thou dost reanimate them, when the time for their new life is come !

As often as I reflect on these revolutions, they lead me naturally to think of what will happen to myself at death ; because, in fact, my state then will, in some measure, resemble that of the birds. When the time of my death arrives, I also shall abandon my abode, my pleasures, and my friends, and pass into a better world. My body also shall sleep for a time, but in the moment of my new creation, I shall awake, and clothed with the strength and beauty of youth, I shall begin a life which shall never end.

What happens to these animals furnishes me with another edifying reflection. I see how God watches over the smallest link of the vast chain of beings, I discover with what paternal bounty he provides for the support of the weakest and most despicable creatures, by preserving them in such circumstances, where the human imagination must think their preservation impossible. Would it not be doing injustice to the wise providence of my Créator, to doubt his care towards me, and to abandon myself to trouble and anxiety, concerning my subsistence ? Certainly, that God who gives birds and insects their nourishment in due season : who provides them retreats and resting places in the holes of the earth, and in the clefts of rocks ; who guides them to seek ther food in distant countries ; this same God will also take care of me, and will not abandon me in times of poverty and dearth. Should I not have the strongest confidence, that he will provide what is necessary for my support, even when I may see the smallest likelihood of it ? and believe that however treated or neglected by man, he will not fail to find me a place of refuge, where I may rest in safety.

MARCH IV.

WINDS AND TEMPESTS.

WITH what violence is the air agitated ! Hear how the winds roar in the upper regions ! See how the clouds gather ! how rapidly they fly ! What torrents of rain do they pour out on the earth ! How terrible is the force of the winds ! they cleave the greatest oaks ; they overturn houses ; they shake the foundations of the earth ; and perhaps at this moment some vessel, alas ! is plunged into the abyss by the violence of the tempest. Above it, the wind bellows ; the gulf yawns under it, and around it the waves of the sea rise mountain high ! Oh ! in what distress are those miserable people ! How they wring their hands ! how they shudder at every wave which seems to arise to bury them in the deep ! Before the fury of the tempest is appeased, there are, perhaps some thousands of families ruined ; and more still who are plunged into the deepest distress by the death of their relations and friends.

“ But why does the wise and beneficent Sovereign of the world permit the winds to spread such terror and devastation over earth and sea ? ” Foolish question ! what rashness to presume to judge and censure the government of a Being infinitely wise ! Ought we not, on the contrary, to consider his ways with respectful silence, and rest assured, that they are always full of goodness ? If tempests and whirlwinds make such terrible ravages ; if they wreck vessels, or plunge them into the bottom of the sea ; if they overturn buildings, and cause both man and beast to perish ; have we a right, because of this, to blame the divine government ? Have they, who calculate with so much care the injury which the element occasions, reckoned also the advantages which it procures to the earth ?

Audacious mortals ! admire and adore the Monarch of the world, who causes even the tempests to contribute to the good of his empire ! It is, in reality, by a particular direction of Providence that, towards spring, storms and tempests usually arise. At the returns of this beautiful season, the mild and moist air opens the earth, which had been shut up during the winter. By this change of temperature, the atmosphere, which the cold had purified, becomes again loaded with noxious vapours ; and epidemic disorders, and the pestilence, would speedily destroy both man and beast, if these agitations of the air, by storms and tempests, did not purify it, and restore its salubrity. By this, not only the stagnated vapours are put in motion, but also vapours of a different nature are, by this agitation, so strongly blended together as to make a happy mixture, useful to the health of man, and to the fertilization of the earth.

Is it not also a great advantage, that by means of the winds, vessels are supplied with a sort of wings, and that these floating houses, laden with the riches of different parts of the world, can make a passage of more than 50 leagues in less than 54 hours ! Thus the Lord,

Winds and tempests.

in the midst of the winds and tempests, is the benefactor of his creatures! As often as we hear the wind roar above us, we should acknowledge his goodness, and reflect, with gratitude, on the wisdom of his government. How admirable are his ways, even in storms and whirlwinds! He brings the winds out of his treasury, causing them to come from the extremity of the earth; marks out the path which they should walk in, regulates their bounds, and causes them to cease when they have fulfilled his purpose. Why then should we be troubled or terrified, when he orders these ministers of his will to fulfil his commands?

“O my soul! though the tempest should howl around thee, the earth quake, the rocks rend, and a veil of darkness be spread over nature, let nothing terrify thee; let nothing disturb thy repose! Cast thy care upon the Lord, and pour out all thy troubles into the paternal bosom of Him who governs the world. He who points out to the stars their course, and to the winds their path, can show thee the way in which thou mayest walk with a steady and secure step.”

How stormy soever my life may be here, does it become me to lose courage, or murmur against God? No! this God, who silences the most impetuous winds, will put bounds to that tempest of tribulations which threatens to overturn me. And, when the violence of affliction shall have shaken me sufficiently, a serene and luminous day shall take place, in which I shall enjoy a profound calm.

Alas! in this stormy season, how many of my brethren, who traverse the seas, if not for my individual advantage, yet for the good of society, now struggle against the waves, and are in dreadful expectation of the moment when they shall be swallowed up! I may sketch their distresses, while, in my peaceable habitation, I hear, without danger, the bellowing of the tempest. Sovereign Disposer of all events! Ruler of the winds and the seas, defend these distressed people from the fury of the waves; and condescend to hear the prayers which they offer unto thee in affliction! Have pity on them, as well as on all those whose life is in danger; and cast on them one of those merciful regards which shall effect their deliverance!

MARCH V.

THE AURORA BOREALIS.

IN winter, towards the vernal equinox, we often see a sort of luminous, transparent, and variously coloured clouds in the sky. A bright light appears from the north, which gradually communicates itself to the clouds in that quarter, till at length streams of a pale light dart from these northern clouds to the zenith.

This ærial phenomenon, which is called the *Northern Light*, or *Aurora Borealis*, may be classed, in certain respects, among those natural effects, the true cause of which cannot be exactly ascertained. Some

Aurora Borealis

naturalists suppose it to be a magnetic matter which, accumulating towards the north, diffuses a certain degree of light to a distance. Others believe, with more probability, that the *Aurora Borealis* is produced by nitrous and icy particles, which being suspended in the air, and joined to vapours, and to fat and oily exhalations, which emanate from whales and other cetaceous animals, which abound in the northern seas, are illuminated and rendered brilliant, by that light, which the Laplanders almost constantly enjoy. Lastly, several philosophers imagine, that this phenomenon is an inflammation of the atmosphere, and a storm not yet come to maturity. The uncertainty in which the wisest and most enlightened men are, respecting this phenomenon, may be very instructive to us. How many things do we see in the air, in the sky, and upon the earth, which are mysterious to the most eminent naturalists! These phenomena should humble the human spirit, which pride, and vain curiosity, often hinder from acknowledging how limited its faculties are.

A thousand little things often confound the most learned in their meditations, and elude all their researches. There are millions of objects, the utility and beautiful arrangement of which we are ready enough to acknowledge; but can very rarely discover their true principles, the ends for which they were destined, and their connexion with the corporeal world, and its different parts. It is, however, a mercy, that this ignorance does not affect our happiness; and though, for example, we are not able to determine satisfactorily whence the *Aurora Borealis* proceeds, yet we may live peaceably and happily without it. After all, however ignorant we may be on this, and an infinity of other points, we know at least, that all the phenomena of the natural and intellectual world happen only according to the will of an omniscient, omnipotent, and infinitely good Being, who directs the whole to the benefit of the universe. We have little occasion to know more, in a life so short as ours; and this, without doubt, will suffice to excite us to adore and bless Him who performs so many wonderful things, and so much above our comprehension.

How grateful should we be to God, that we were not born in those times of ignorance and superstition, in which whole nations were thrown into consternation and terror by such phenomena. This magnificent spectacle presented to their troubled imagination whole armies fighting in the air; and from this they drew the most melancholy prognostications. To them, the *Aurora Borealis* was a prophet, which one time foretold war, at another famine, at another epidemic disorders. But we may find, in the mild and majestic splendour of that light, a token of the power and goodness of God. We may behold these celestial fires without dismay, because we know that the Lord of heaven has created nothing for the misery and torment of his creatures; and, probably, the inhabitants of the northern countries derive great advantages from those phenomena, though they have so little influence on ours.

The extreme smallness of certain bodies.

MARCH VI.

THE EXTREME SMALLNESS OF CERTAIN BODIES.

THE vault of the heavens, the depths of space, and its unlimited extent ; those vast bodies which shine in the firmament, the various creatures which inhabit our globe, and fill the air and the waters ; all proclaim the glory of the mighty God, and announce his infinite power. But we must not imagine that the power and wisdom of the Creator are to be seen only in the immense grandeur of the world : even in the smallest objects, and in the most inconsiderable parts of nature, we may find the greatest subjects for admiration.

The structure of a grain of sand, seen through a glass which magnifies a million of times, is sufficient to fill the greatest mind with astonishment. Who would not be surprised to find, that an insect makes its abode in a grain of sand, which can scarcely be discerned by the naked eye ? Examine, also, (with a microscope which magnifies some millions of time,) the mould of a piece of bread, and you will discover a thick forest of fruit-bearing trees, whose branches, leaves, and fruit, may be easily distinguished. Even in our bodies, objects inconceivably small may be discovered, which we seldom attend to ; and which, notwithstanding, well deserve our admiration. The body is covered with an innumerable multitude of pores, a small part of which can only be discovered by the naked eye. The epidermis resembles the scales of a fish. A grain of sand can cover 250 of those scales, and one scale covers 500 pores, which give passage to sweat, and to the matter of insensible perspiration.

Have you ever considered the wonderful structure of the hairs of your head ? Inconsiderable as they may seem, they are, notwithstanding, a masterpiece of divine workmanship. They are hollow tubes, each of which has its bulb or root, a marrowy substance, and many little filaments, which unite in them. In that whitish matter which grows on the teeth, commonly called *tartar*, by means of a microscope which magnifies a million of times, a great number of small animals have been discovered ; and in a small portion of it, about the size of a grain of gunpowder, a million of these animalculæ have been seen.

Are not these so many circumstances, calculated to humble our spirit, and show us, in a still clearer point of view, the grandeur of the Supreme Being ? Every thing should convince us, that there are a thousand objects in nature which are mysteries impenetrable to us ; that an infinity of discoveries remain to be made ; and that we know, but superficially, the things with which we are best acquainted. There are probably a multitude of wonders in our own bodies, which no person has yet thought of, and which we are very far from suspecting. And how many imperceptible objects may there be in nature, which are beyond the reach both of the microscope and our understanding ;

The extreme smallness of certain bodies.

and which, if known, would furnish us with new proofs of the greatness of God? But the little that we do know may suffice to convince us, that in *small* things, as well as in *great*, the power, wisdom, and goodness of the Lord, are manifested in an admirable manner.

“The sand of the sea declares the glory of the mighty God, as well as the expanse of the heavens, the splendour of the sun, and the violence of the tempests. The smallest worm seems to say to us, Give glory to God! The trees, in the magnificence of their clothing; grain and seeds, in their minuteness, cry with a loud voice, “It is God who hath made us, give glory to our Creator!” And to him, and to him only, we should give the glory. The *smallest* of his creatures may cause us to recollect his *greatness*. Let us admire and adore his power and wisdom in the formation of the *gnat*, even as in the structure of the *elephant*; in the humble form of a *spire* of *grass*, as in the majestic height of the *oak*; in a grain of *sand*, as in the highest *mountains*!

No creature that he has formed should appear unworthy our attention; and, probably, the creature, which is most abject in its appearance, may contain the greatest wonders! A being which God has condescended to form and preserve, is, on this account, worthy of contemplation and esteem. I am myself little, in comparison of the innumerable worlds which God has made, notwithstanding he condescends to take care of me, and direct my movements with the same wisdom and goodness by which he directs the course of the stars: what am I, O Lord! that thou shouldst be mindful of me; and how can I, who am but dust and ashes, sufficiently praise thee for the many mercies which I have received from thy benificent hands!

MARCH VII.

WINTER WITHDRAWS GRADUALLY.

THE same wisdom which at the commencement of winter caused the cold to increase by degrees, causes it at present to diminish by little and little; so that this severe season draws insensibly towards its close. The sun continues a longer time above our horizon, and his rays act more powerfully upon the earth. The flakes of snow cease to obscure the atmosphere; the nights produce only a white frost, which the mid-day sun causes to vanish. The air becomes serene, fogs and vapours are either dispersed, or fall down in fertilizing showers. The earth becomes lighter, more mouldy, and fitter to imbibe moisture. Seeds begin to spring up; the branches, which appeared dead, resume their tender buds, and various blades of grass venture to arise out of the earth. We see the preparations which nature is making to restore, in a few weeks, verdure to the fields, leaves to the trees, and flowers to the gardens. She labours silently

Winter withdraws gradually.

to bring back the spring ; though tempests, hail, and frosty nights, are still putting some obstacles in the way. Soon, however, she shall lose her sad and mournful aspect, and the earth shall appear again in all the beauty of youth.

Thus, all the changes in nature are brought about gradually. Each effect which we behold, has been prepared by a preceding cause ; and a thousand little circumstances which escape us, succeed each other, till the great designs of nature are accomplished. A multitude and infinity of springs must be put in motion before one blade of grass can spring up, or one bud be unfolded. All those variations which, during the winter, were so disagreeable to us, were necessary in order to open that smiling prospect which is now before us. Tempests, rain, snow, and ice, were all necessary, that the earth might rest and acquire new strength, and new fertility. Nor could any of these changes happen sooner or later ; be more or less speedy in its operation ; be of longer or shorter duration, without injuring, in one way or another, the fertility of the earth. Now that the advantages of these arrangements of nature unfold themselves insensibly before us, we discover the ends which she proposed, and the happy consequences of winter prove that this season is a real blessing to the earth.

As the seasons, so the periods and events of our life, are continually varying. In the life of each man there is such an admirable and mysterious chain of causes and effects, that nothing but futurity can discover to us why such and such events were necessary and beneficial. We may see, perhaps, at present, why God caused us to be born of such and such parents, rather than others ; why it was that just such a place, and not another, should have been that of our birth ; why such and such afflictive events took place ; why it was necessary that we should embrace such a mode of life, rather than another :—all this was at first hidden from us ; but now we comprehend, that the past was necessary for the present : and the various events which did not appear to comport with the plan of our life, were, nevertheless, indispensably necessary to our present degree of happiness. We also draw near to that moment when all the events of our life shall be developed and explained. And, perhaps, we are very near that period, when the winter of our life shall end, and we shall be on the point of entering into a new world. O my God, and my Father ! fill my heart with joy and peace in believing ! and when the visible creation shall disappear from before my eyes, grant me an entrance into a blessed eternity : and give me those foretastes of it now which shall raise my soul above every earthly and perishable thing ! Amen.

MARCH VIII.

THE EXTERNAL PARTS OF THE HUMAN BODY.

WHILE nature does not appear in all her beauty ; while the fields and gardens are destitute of those charms which are so well calculated to recreate the mind ; let us employ ourselves in considering the structure of our bodies. This will afford us a better opportunity to acknowledge the power and wisdom of God ; and we may learn, in the mean time, to appreciate our earthly life.

Among all the visible parts of the body, the *head* holds the most distinguished place, both because of its beauty, and because it contains the principles of sense and motion. All the sentiments and passions of the soul are painted on the *face*, which is the most beautiful part of man ; and where the principal organs of sense are found, through the medium of which we receive impressions from external objects. The different motions of the *lips*, and those of the *tongue*, whether it touch the palate or the teeth, serve for the articulation of words, and the different inflexions of sound. By the *teeth*, we can cut or grind our food ; and the *saliva*, so necessary to digestion, is furnished by a great number of glands which are contained in the mouth. The head is placed upon the *neck*, and turns as on a pivot to any side we please. After the neck comes the *shoulders*, so formed, that they are able to bear heavy loads. To the shoulders the *arms* are joined ; and to those, the *hands*, which are so constructed as to perform an infinity of motions ; to touch, take, raise up, draw back, repel, &c. the joints and bones serving to support and facilitate these motions.

The *breast* includes and defends the heart and the lungs ; and for this purpose, it is composed of strong and hard ribs and bones. The *diaphragm* separates the *breast* and *belly*, which contain the stomach, liver, spleen, and intestines. All this mass rests upon the *hips*, *thighs*, and *legs*, which, like the arms, have different articulations favourable to motion and rest. The *feet* sustain the whole, and the *toes* also contribute to it, because they serve to fix the feet more firmly upon the ground. The *skin* and *flesh* cover the whole body. The *hair* and the *down*, which are found in different parts, protect them from the injurious effects of cold.

What a diversity is there in these several parts of the body ; and yet they are only the principal and most essential ! Their form, their structure, their order, their situation, their motions, their harmony, all furnish us with incontestable proofs of the wisdom and goodness of the Creator. Not one of the different parts of the body is imperfect or deformed ; none is useless, none injures another, none is misplaced.

Were we, for example, deprived of our *hands* ; or, if they were not provided with so many joints, we should be incapable of executing the greater part of the things we do at present. If, preserving our reason, we were quadrupeds, or reptiles, we should be unfit for many

The external parts of the human body.

arts and trades ; we could not work, move, or turn with so much facility : we could not easily contemplate the glorious face of the heavens. If we had but one *eye*, and that placed in the middle of our foreheads, it would be impossible for us to see to the right and left, to take in so large a scope, or to distinguish so many objects at once. Were our *ears* differently situated, we could not so easily hear what passes around us. In a word, all the parts of our bodies are so constructed and arranged, that they concur to the beauty and perfection of the whole ; and are properly adapted to accomplish the various designs of the Creator.

Let us bless our God that we have been formed in so admirable a manner ! May we have a due sense of the favour of having a body so well constructed ! and may this sentiment never be effaced from our hearts ! May we recall it to mind, as often as we consider our bodies, or use any of our members ! and then we shall certainly never make an improper use of any of our powers. We shall, on the contrary, employ our bodies, and all their different parts, to the good of society ; and be continually attentive to glorify our God with our bodies and spirits, which are his.

We are so much the more obliged to make this noble use of our bodies, because that, after they shall have rested some time in the grave, we shall receive them again, incomparably more glorious and perfect. And is it possible that we should dishonour a body that shall be so gloriously employed in the world to come ? Can we profane a body which is one day to be conformed to the glorified body of our Lord ? Shall we abuse the members which are destined to such sublime employments ? No ! the blessed and glorious hope of our future happiness should animate us, from this moment, to present our bodies to his holy service ; to consider them as the temple of the Divinity, and to preserve them pure and without blame till the glorious advent of Jesus Christ.

MARCH IX.

THE HOPE OF SPRING.

EVERY day brings us nearer to the pleasures of spring ; and strengthens our heart in the hope of speedily seeing the time, in which we may respire with more ease, and contemplate nature with more joy and satisfaction. This sweet expectation is the only hope, of an earthly kind, which will not deceive us : because it is founded on the invariable laws of nature. The charms of this hope are felt in every heart, without distinction ; for the king and the beggar may, with unmixed joy, see the approach of spring, and promise themselves certain pleasures on its arrival. This hope is not accompanied with impatience, because it extends far, and takes in a multitude of objects. The coming of spring procures us a thousand new delights : the

The hope of spring.

beauty and odour of flowers, the singing of birds, and the smiling prospect of universal joy. The greater part of terrestrial hopes is attended with anxiety ; but the hope of spring is as innocent as it is pure ; for nature never deceives us ; on the contrary, her presents generally exceed our expectations, both in their number and excellence. Let us, therefore, in these boisterous days of March, enter fully into the pleasing hope of spring's approach, and the joy which it inspires.

It is a great blessing of a gracious Providence, that in all the revolutions of the seasons, and in all the vicissitudes of life, we may indulge the hope of seeing better days. Winter, which is now drawing near its close, would have been much more gloomy but for the hope of spring. Encouraged by this hope, we have patiently suffered the inconveniencies of the cold and bad weather ; and at the present we are at the point of seeing this hope abundantly realized. After a few more disagreeable days, the sky will become more serene, the air more mild ; the sun shall re-animate nature, and the earth shall re-assume her ornaments.

Let us return thanks to the infinitely good God for the sources of pleasure which he has opened to us to mitigate the sufferings of life. With what goodness does he hide the future from our eyes, while he gives us a glimpse of the blessings and pleasures designed for us ! Without *hope*, this earth would be a valley of misery, and our life a series of pain and sorrow. But he has given us hope to be the pleasing companion of our pilgrimage. When all is gloomy around us, this opens a beautiful prospect into futurity, re-animates, and causes us to walk contentedly through the thorny path of life.

How often has our heavenly Father, by this mean, comforted us when cast down, and strengthened our courage, which was ready to faint ! Let us bless him for every ray of hope, by which he has refreshed our souls ; for every blessing we have already received ; and for all those which are reserved for us. But what words can express the grandeur of that hope, which, as Christians, we may enjoy !

Let thy mercy be extolled, O thou Divine Redeemer, who hast merited for us the right to expect a felicity which is not to be shut up within the narrow bounds of this life ! Blessed be thy name, for the glorious hope of everlasting life, which thou hast purchased for us ! What would life be, without this ! What would the pleasures and happiness of this world avail, had we not the blessed hope of living eternally, and of being eternally happy ? And, if we enjoy this comfortable hope, should we not count all our sufferings here below as nothing ? What matters it, if the winter of my life be long and severe ! I hope for a spring ; I expect the renovation and perfection of my being in the world to come.

MARCH X.

THE HOARFROST.

IT is very common, in these times, for the bushes, and other matters exposed to the air, to appear like candied substances. The hoar, or white frost, to which this appearance is owing, is no other than frozen vapours which lose their fluidity by coming in contact with cold bodies. Every day some dew falls, however imperceptible it may be; its fluidity can only proceed from heat; and it is very easy for a body to lose its heat, when it is light and thin, and comes into contact with a substance colder than itself. In the cold nights of spring, the twigs will sooner lose their heat, than the large branches; on this account it is the smaller branches are covered with hoarfrost, while the larger ones are free from it. When the dew comes in contact with bodies considerably colder than itself, a part of its heat is immediately communicated to them; the natural result of which is, that the dew, having lost the cause of its fluidity, its particles contract, unite more closely, and thus form a light coat of ice. If to those vapours, disposed to freeze, others are joined which have not that disposition, the latter instantly lose their fluidity, and settling irregularly on the former or beside them, they form together what we term *hoarfrost*.

It is therefore easy to understand how it happens, that sometimes our hair, and the hair of animals, is covered with hoarfrost. If the matter of perspiration, and the breath from the mouth and nostrils, be attached to the hair, and be exposed to the action of cold air, this congelation will be the consequence. In the same way we can account for those shining threads which are seen upon houses during winter. If the walls have a certain degree of cold, the aqueous vapours which are attached to them will condense; but, when the cold is very intense, and it freezes keenly, this effect is not produced, because these vapours are already frozen in the air; and even, supposing that they could fall upon the wall, they could not adhere to it, because some points only could come in contact with it. Nevertheless, it sometimes happens in this species of frost, that the walls grow white as if covered with snow; but this is an infallible sign that the severity of the cold is going to abate.

Here, also, we may perceive the wise and beneficent designs of the Creator. In his hand, and under his government, all natural effects, and every season of the year, tend to the general good, by rendering the earth more fertile. And seeing that in the great connecting chain of all the parts of the creation each phenomenon contributes its part to the perfection of the whole, is it not reasonable to acknowledge the wisdom of God in each part in particular, and celebrate him for all his benefits?

Means which contribute to fertilize the earth.

MARCH XI.

MEANS WHICH CONTRIBUTE TO FERTILIZE THE EARTH.

DIVINE Providence makes use of a variety of means to render the earth fruitful. Sometimes the clouds fall down in rain, in order to purify the air from noxious vapours, to mellow the earth, and to supply it with fresh nutritive juices. At other times, when the earth is deprived of the benefit of rain, a gentle dew moistens and fertilizes the soil, and revives the plants which were ready to wither away. It has pleased God that every season should have peculiar means of fertilizing the earth. The snow, which in the past winter covered our fields and meadows, not only preserved the earth from the severity of the cold, but by means of the salts with which it was impregnated contributed much to enrich the soil. The frequent tempests which take place in spring, preserve the air from corruption, dry the earth, and disperse the rain over the surface of the globe; and even those storms which take place in summer, though they terrify timid people, have a benign influence in fertilizing the earth. Through every tempest, the Creator pours upon the earth his precious blessings.

We may, without extravagance, confidently maintain, that there is not a change in the air, or on the earth, that does not contribute, either directly, or indirectly, to the fertility of our globe. Each season brings forward its own peculiar phenomena, and each phenomenon of nature produces effects, the blessed consequences of which are more or less visible. Even those scourges, which produce present damage in some countries, are only a partial evil which contributes to accomplish the beneficent designs of Providence; for advantages result from them to the world, considered in a collective sense. In all things, and through all times, we may acknowledge the tender care, and merciful interference, of a Creator infinitely wise, and infinitely good.

“Lord of times and seasons! thy praise extends from the orbit of the earth to the heaven of heavens! Our globe rolls in the starry expanse, at one time adorned with flowers, at another time covered with snow; here adorned with vines, there covered with thorns; yet still it celebrates the glory, and unites its accents to the music of the spheres. When snow and ice change our meadows into deserts; when the hurricane bellows in the air; when the lightning causes the hearts of men to tremble; when rivers overflowing their channels, and drown whole countries; when all the elements seem to conspire the destruction of the world; even then thou art preparing joy, salvation, fertility, and plenty, for the inhabitants of the earth.”

Here we may represent to ourselves the various means which God makes use of to fertilize the moral world. To give men a proper knowledge of his will concerning themselves; to fill them with hatred to sin, and the love of righteousness, God employs sometimes gentle, sometimes violent means. Sometimes he thinks proper to fill the

Means which contribute to fertilize the earth.

sinner's heart with terrors ; to lay heavy judgments and chastisement of long duration, upon him, in order to awake him out of his sleep. He speaks to hardened hearts as he did to the Israelites from Mount Sinai, in thunders and lightnings. Towards others he uses different methods ; he strives to snatch them from vice and vanity, and draw them to himself by the pleasing voice of his beneficence.

Am I not a living witness of this ? Yes, Lord ! I acknowledge, to the praise of thy grace, that thou hast made use of all these means to lead *me* to thyself. Sometimes thou hast been pleased to lay thy heavy hand upon me, and to confound my pride, by various chastisements. Thou hast sent me afflictions, and other trials, to bring me to a proper consideration of my ways. At other times, thou hast endeavoured to draw me unto thyself by the mildest means. Thou hast loaded me with thy benefits ; and thy favours have descended upon me as abundantly as the vernal showers upon the earth. But, what returns have I made, after so many means having been employed for my conversion ? Have I brought forth those fruits which a good soil ever produces when the heavens are favourable to it ? Alas ! my heart has been like a rock, which no thunder could shake, no rain mollify. Has not the greater part of the means which thou hast hitherto used towards me, to bring me out of the paths of error, been unsuccessful ? But must this always be the case ? No ! it is high time that I should become more teachable, and submit to God. The longer I continue in impenitence, the more my transgressions and iniquities will increase ; and the more difficult will it be for me to turn from the paths of sin. One favour I ask from thee, O God : it is this, that thou wilt not cease to strive with me. Terrify me by thy threatenings, or comfort me by thy promises : draw me to thyself by the severity of chastisements, or by the allurements of beneficence ; I will praise thee for all the means of grace which thy wisdom shall think proper to employ : only bring me back to thyself, and make me fruitful in good works. Amen.

MARCH XII.

ADVANTAGES WHICH WE DERIVE FROM THE SEA.

A SUPERFICIAL view of our globe might give room to believe, that there is no proper proportion between the earth and the water : at the first view it seems, that the immense expanse of water accords ill with the idea we form of the Divine wisdom and goodness. We think it would have been more advantageous, had the Creator converted the ocean, seas, lakes, and rivers, into solid earth : but in this, as in a thousand other things, we only show our ignorance and want of judgment. If the ocean were reduced one half, it could afford but one half of the vapours which are now raised from it ; and consequently we could not have so many rivers, nor would the earth be

 Advantages which we derive from the sea.

sufficiently watered ; for the quantity of vapours which are raised is in proportion to the surface of the sea, and the heat which attracts them. Thus the Creator has wisely ordered, that the sea should be large enough to furnish a sufficiency of vapours for watering the earth, which could not have been the case, had it occupied less space. The sea, then, has been made the general reservoir of waters, that the heat of the sun might draw up the vapours which afterwards fall down in rain, or form brooks and rivers when they have been deposited on the tops of mountains. Were the sea more contracted, there would be more deserts and barren regions, because there would be less rain, and fewer rivers.

And what would become of the advantages which we derive from commerce, if this great abyss of waters did not exist ? God has so designed, that one part of the globe should not subsist independently of another. On the contrary, he has purposed that there should be a connexion between all the inhabitants of the earth. It is on this account that he has intersected the globe with seas, to open a communication between the inhabitants of the remotest parts of the earth. How could we procure our rich goods and treasures, were we obliged to transport them all by horses and carriages ? Could commerce itself exist, if navigation had not opened the easiest way to it ?

In this division of our globe into land and water, we may see a new proof of the wisdom and goodness of God. However distant we may be from the sea-coasts, we daily experience its blessed influence. Why are we not more grateful to God for this blessing ? Should not the knowledge of his adorable attributes, which heaven, earth, and sea, impresses upon our minds, excite us to glorify his holy name ? Yes, Lord ! and my heart is disposed to render thee the thanks which are thy due : assist, by the influence of thy Spirit that my praises may be acceptable ! Yet, perhaps, I am not as sensible of this blessing as I ought to be : others, probably, value it more : but were there none upon earth that acknowledged thy favours, the sea itself would be a witness of thy power, and a herald of thy wonderful goodness ; for all thy creatures, the sea, the land, and all their inhabitants, celebrate thy praises, thou most gracious God !

 MARCH XIII.

THE DIFFERENCE BETWEEN PLANTS AND ANIMALS.

THE difference between animals and plants is so great and evident, that it requires only a superficial observation to be convinced of it. Undoubtedly, the most remarkable difference consists in this ; that animals can move, and change their place ; a faculty of which vegetables are entirely destitute. But a more essential difference still is, that animals have the faculty of feeling, which cannot be attributed

Difference between plants and animals.

to plants. To this we must add, the manner of being nourished. Animals, by means of external organs, are capable of choosing that food which is suited to their nature : plants, on the contrary, are obliged to receive such nourishment as the earth brings, without the power of making any choice. This nourishment they receive from the humidity of the earth, and by the action of the tubes of their leaves, which attract and imbibe the nutritive juices from the earth and air. The number of species is much more considerable in the animal than in the vegetable kingdom. Among insects only, there are, probably, a greater number of classes, (including those which cannot be discovered but through a microscope,) than there are of visible plants on the face of the globe. Besides, animals have not such a conformity among themselves, as plants have with each other ; and this resemblance renders it more difficult to reduce them to classes. Another circumstance which establishes the difference between the two kingdoms is, the manner in which plants and animals propagate their species. This is very distinct, notwithstanding the accidental similarity which may appear in some cases.

The only place in which plants can grow and multiply, is the earth. The greater part rise above the surface, but are attached to the ground by roots more or less strong. Others are entirely under the earth : a small number grow in the water ; but, in order to live, it is necessary that they should take root in the earth. The habitation of animals is, on the contrary, less limited. They spread themselves over the earth. An innumerable multitude people its surface and interior parts. Some dwell in the bottom of the sea ; others swim in the waters at a convenient depth. Many live in the air, in vegetables, on the human body, on animals, in fluids, and even in stones. If we consider animals and plants, in reference to their size, we shall find the difference much greater. Between the monstrous *whale*, and the tiny *mite*, the difference is more considerable than between the highest *oak*, and least sprig of *moss*. Finally, it is particularly in the *form*, that the most general and visible difference between plants and animals consists. The greater part of the latter have, in this respect, such distinguishing characteristics, that it is impossible to confound them with vegetables.

After all, let us not imagine that we have discovered the bounds which separate the animal and vegetable kingdoms, or that we have found out all that distinguishes them. Nature, in order to diversify her works, makes use of almost imperceptible shades. In the chain of beings, perfection increases successively, and ascends by thousands of degrees, so that the most perfect species differs but little from that which occupies the next degree below it. But, how narrow are the limits which separate plants and animals ! There are plants which appear sensible, and animals which seem to be deprived of sensation. Nothing proves the truth of this more than the discoveries which have been made in *corals*. Formerly, corals were considered as marine plants ; but, at present, we have strong reasons to class them

 Difference between plants and animals.

with animals ; for that which has hitherto been considered as a flower, is now well known to be a real animal. Thus each order of creatures arrives at its perfection, by innumerable gradations. The more we multiply observations, the more we shall be convinced, that we cannot exactly determine the bounds of the animal, vegetable, and mineral kingdoms ; and that, among most creatures there is more conformity than dissimilarity found : at least, we are sure, that the bounds which separate the most perfect creatures from those which are least so, are imperceptible to such limited understandings as ours.

What has been said should convince us, that the world, and all the creatures which it contains, are the work of an infinite intelligence : and so much harmony and so many differences ; so much variety, and, at the same time, so much uniformity, could not proceed but from the almighty, omniscient, and infinitely good Being, who has created the universe, and all that exists. Let us raise our hearts to him : let us go from stone to plant, from plant to beast, from beast to man, and from man to angels : then dart up to that infinite Being, the incomprehensible, omnipresent Creator of heaven and earth ; the Preserver of plants, the Protector of animals, the Father of men, the King of angels. Measure, measure if you can, his grandure !—endeavour to fathom the abyss of his wisdom ! Most holy God ! created beings are too weak to understand thy works ! they are immense : and in order to comprehend them, we must be, what is impossible, *infinite*, like thyself !” Therefore, the less capable we are of conceiving how extensive thy wisdom is, the more we should endeavour to meditate upon thy grandure, and to imitate thy goodness to the utmost of our power. We see, that no creature is destitute of the gracious care of the Supreme Being : that care is extended to the stone and to the plant, as well as to animals and to men. In his sight there is (in some respects) no distinction. His mercy is over all his works. In this respect also, let us endeavour to imitate our Maker. We occupy, it is true, a distinguished rank among created beings ; but let us take heed that we be not cruel and tyrannical towards those creatures which appear to have received less prerogatives than we have. Let us rather enjoy, with gratitude and moderation, all those creatures which God has granted us for our use, to the end that in all things God may be glorified through Christ Jesus : to whom belong honour, praise, and thanksgiving, for ever and ever !

 MARCH XIV.

UNIFORMITY AND VARIETY IN THE WORKS OF NATURE.

THE sky above us, and the earth under our feet continue the same from age to age. Nevertheless, they exhibit, from time to time, spectacles as varied as they are magnificent. Sometimes the sky is covered with clouds ; at other times it is serene : sometimes blue, at others painted with different colours. The darkness of the night, and the

Uniformity and variety in the works of nature.

brightness of the day ; the blazing light of the sun, and the pale light of the moon, succeed each other regularly. The immeasurable space of heaven appears sometimes a desert, at others strewed with an infinite number of stars. To how many changes and revolutions is our earth subject ! For some months it is unadorned and uniform, the severity of the winter having robbed it of its beauty ; by and by the spring comes, and renews its appearance ; summer shows it to us still more rich and beautiful ; and, in a few months, autumn shall cause it to pour into our bosom fruit of every description. There is also a great variety between one country and another. Here a flat level country presents plains, the beauties and limits of which the eye cannot take in : there high mountains, covered with forest, elevate themselves ; and, at their feet, fertile vallies, watered with brooks and rivers. Here gulfs and precipices ; there lakes and stagnant waters ; farther on, impetuous torrents. On all sides, we perceive a variety which delights the eye, and causes the heart to expand with sweet and pure delight.

This same assemblage of uniformity and diversity may be observed in all the vegetables on our globe.—They all receive, from their common Parent, the same nature, and the same nourishment. They all have the same mode of springing up, and growing ; but what prodigious difference is there between a blade of grass and an oak ! All, together are ranged under certain classes : those of the same species are, undoubtedly, very like each other, and, notwithstanding, what great differences do we see in each ! It is the same with respect to animals : the wisdom of the Creator has also divided them into different classes ; and, whatever diversity there may be among them, they preserve, nevertheless, the same essential resemblances. There is even a certain degree of conformity between man and the lowest species of animals. However elevated he may be, in certain respects, above animals, has he not, in common with them and even with plants, the same means of nourishment ? Is it not the sun, the air, the water, and the earth, which make provision for all ? Plants grow up, ripen, wither and die : and those laws of nature extend not only to animals, but also to man.

If we next examine the varieties in the human species, what an astonishing assemblage of conformities and diversities do we find ! Human nature, at all times, and among all people, is ever the same : nevertheless, we find, that in this innumerable multitude of men, scattered over the earth, every individual has a form peculiar to himself : a physiognomy and talents, which in certain respects, distinguish him from all others. It seems as if the wisdom of the Creator designed to diversify his works in the highest degree, as far as was compatible with the essential and particular construction of each species. All the creatures on our globe are divided into three classes, *minerals*, *vegetables*, and *animals*. These classes are divided into *genera* ; these *genera* into *species*, and these *species* into innumerable *individuals*. Hence it is, that there is no unconnected creature upon the

 Uniformity and variety in the works of nature.

earth ; none that is destitute of all relation to some particular species ; all having a sort of connexion with others, and a general affinity to the rest of the world.

From this assemblage of uniformity and diversity, which extends *ad infinitum*, the order and beauty of the universe is derived. The difference which exists between the creatures of our globe, demonstrates the wisdom of the Most High, who chose that each being should occupy a determined place ; and has so fixed their destination, that it would be impossible to annihilate the relations and oppositions which he has established among them.

Even the minutest works of nature, those which cannot be discovered but by the assistance of a microscope, present so much unity and variety, that they necessarily raise our souls to the contemplation of the infinite wisdom of the Creator.

It is true, O Lord our God ! that thou hast regulated all with wisdom, and referest every thing to the common happiness of thy creatures. Though I have now been able to view thy works only in a superficial manner, yet my soul is transported with astonishment. What would it be, were I capable of penetrating farther into the essence of beings, in order fully to understand their structure. Nevertheless, Father of lights ! eternal Source of wisdom ! I return thee thanks for this slight acquaintance with them which thou hast condescended to grant me. May I ever consider it one of my most pleasing employments to meditate upon thy wonders, and to acknowledge thee in every object of nature. By and by, our fields will present us with the most pleasing view of variegated beauties, which the spring scatters over the earth. I rejoice at the approach of that moment : my heart anticipates it under a lively sense of thy wisdom and goodness.

 MARCH XV.

OF SEEDS.

ALL vegetables spring from *seeds* ; but the greater number of these are not sown, and are even invisible to men : nature disperses them. For this purpose, she has furnished some seeds with a certain light down, or feathered tufts, which serve as wings for the wind to carry them away, and disperse them abroad. Other seeds, though small, are heavy enough to fall perpendicularly on the ground, and sink of themselves into it, without needing any assistance. Others, though large, are yet light enough to be carried by the wind ; but, lest they should be transported too far from their native place, they are furnished with little hooks, by which they lay hold on the different matters they meet with ; and thus are stopped in their progress. There are others enclosed in elastic capsules, which, when they have acquired a proper degree of dryness or moisture, burst open, and by

their elasticity drive the seed to a convenient distance ; and what is still more admirable, nature has entrusted this business of sowing to birds, who deposite the kernels of fruit they have eaten, which take root, grow up, and flourish.

Ravens have been known to plant oaks in the following manner ; they make a hole in the earth with their beak, put an acorn into it, and then cover it over with earth and moss. It is not supposed that they do this with a design to plant trees : they are led to it by instinct. They bury the acorn, that they may preserve it for food : it takes root, and in process of time becomes an oak. Many seeds, by their pleasant taste and agreeable smell, invite birds to swallow them, and to carry them hither and thither. After having kept them some time in their stomachs, being rendered more fertile by the heat of their bowels, they drop them on the earth, where they take root, thrive, blossom, and produce new seed.

Let us admire here the wise and tender care of the Creator. If the sowing of seeds in meadows and forests had been entirely left to man, in what a desolate state must these fields and forests be found ! But observe how, at the return of spring, grass and flowers proceed from, and embellish the earth, without man's having in any degree contributed towards it. Tender and beneficent Father ! how great is thy love to thy creatures, and how admirable is thy wisdom !

But these are not all the wonders which seeds present us. What farther merits our attention is, that the whole plant, however great it may be, is nevertheless hidden in the narrow compass of the seed. The whole stem of the oak, with all its roots and branches, are found in miniature in the acorn. But this is not all : as the preservation and propagation of every species depend principally upon the seed, the Creator has taken care to protect it sufficiently. As to those plants which continue all the year in the earth, with what care and precaution are their blossoms and seeds shut up during the winter, in the buds, where they are well protected, and covered with close tunics of a curious texture. And those other plants which cannot endure the cold of winter, are preserved under the earth, either by their roots, or fruit, till the gentle heat of the vernal sun causes them again to spring forth.

Some seeds are lodged in the middle of the fruit : others in shells and purses : some in capsules, and wooden sheathes ; but each is protected and defended in such a manner as is most suitable to its nature.

The hand of the Creator may be seen in every thing. Even the smallest works in nature manifest his wisdom and goodness. At present, while the husbandman is employed in depositing different seeds in the earth, may I be busily employed with my God ! It is Thou alone, who canst sow the seed of righteousness, who canst cause it to bud and bring forth fruit. It is by Thee, that it is preserved in evil seasons, and by thee it acquires its usefulness and perfection.

Magnitude and distance of the sun.

MARCH XVI.

MAGNITUDE AND DISTANCE OF THE SUN.

IF we have never properly considered the extreme littleness of our globe, and our own meanness, perhaps we may be deeply affected both with the one and the other, when we consider the immense body which communicates light and heat, not only to our earth, but to a multitude of other worlds. The sun is almost in the centre of the planetary system, and is, in certain respects, the monarch of more than twenty worlds; for the primary and secondary planets are only worlds which receive their light, heat, and motion from the sun. This alone would be sufficient to prove, that this body must be of a prodigious size; and what confirms this is, his visible magnitude, notwithstanding his immense distance from us. But, on this subject, no doubt can remain, if we admit the calculations of astronomers. From these it appears, that the diameter of the sun is more than one hundred times greater than that of our earth, and, consequently, that he is more than one million of times larger than our globe. Probably it would be more easy to ascertain its exact size, if it were not at such a prodigious distance from the earth.

Astronomers differ concerning this distance; but, taking the medium of their calculations, we may safely assert, that it is not less than 95 millions of miles from us. This distance is perfectly suited to the effects of the sun, and its influence upon our earth. Some planets are nearer to him; but, were ours in their place, it would be reduced to ashes: others are farther off; were the earth at the same distance, it would be enveloped in frightful and perpetual darkness, and be absolutely uninhabitable. Nevertheless, we are authorized to believe, that those planets which approach him nearest, or are at the greatest distance from him, are suited both in their own nature, and in the nature of their productions and inhabitants, to the places they occupy: whether this suitableness comes from the peculiar constitution of their atmosphere; or whether their substance, and the bodies of their inhabitants, be formed so as to be able to bear a greater degree of heat or cold.

Probably, what has been said concerning the magnitude and distance of the sun may appear exaggerated; for our eyes can discover nothing so large as the earth which we inhabit: and to this alone we compare that sun which is a million of times greater. That luminary, at such a distance, appears small to us: and on this account we are tempted to believe our eyes, rather than our reason. If God had placed us on a planet, which, compared with the earth, were as small as our earth is in comparison of the sun, the magnitude of the earth would have appeared to us as improbable as that of the sun now does. It is not strange then, if we are struck with astonishment at the immense magnitude and distance of that luminary. If now, in contem-

 Magnitude and distance of the sun.

plating a mite, or a spire of grass, we discover so many wonders, what must there be in so large and glorious a body as the sun!

But it was not merely to excite our admiration that God placed this beautiful luminary in the heavens. Our admiration should cause us to ascend to that Supreme Being, who is the Creator, Guide, and Preserver of the sun. In comparison of his infinity, the magnitude of the sun is but a point; and his splendour is but a shadow in comparison of the glory of the majesty of the Lord. How great must His power and glory be who has created the sun! Let us endeavour to pursue this idea; let us dwell upon it, and we shall find it infinitely more incomprehensible than the distance and magnitude of the sun. If the earth be so small in comparison of this globe of fire, how inexpressibly little must it be in comparison of the Lord! If between the earth and the sun there be such an immense space, how inconceivable must the distance be between us and the Infinite!

“Who is like unto thee, O Jehovah! What can be compared to thee? Thy glory is exalted beyond all praise! the most sublime spirit cannot comprehend thy grandeur! Splendour, glory, and majesty surround thee, O thou, who art the principle and life of all creatures: and thou clothest thyself with light as with a garment!” Let it be our constant employment to praise the Lord, as often as we feel the salutary effects of the sun, which is the masterpiece of his hands. Let this witness, who attests the grandeur of God, whose testimony we may every moment receive and feel, teach us how worthy our Creator is to be adored, with what tender solicitude he watches over us, and how much he deserves our confidence and love.

But while we admire the sun that shines above our heads, let us not forget the Divine Redeemer, that *Sun of Righteousness*, who has shone upon us in our misery, and whose rays dispense comfort, health, and salvation. The influence of his grace is as necessary to our salvation, as that of the sun to our natural life. We should have been buried in a night of the deepest obscurity, in a night of sin and despair, if, by his doctrine and redemption, he had not brought light, consolation, and righteousness into the world.

 MARCH XVII.

THE IMPERFECTION OF OUR KNOWLEDGE IN NATURAL THINGS.

WHY has not the Creator given us faculties by which we might be able to fathom all the phenomena of nature? The limits of our understanding, in this respect, seem ill calculated to accomplish the end which he has proposed. He wills that we should be acquainted with his perfections, that we might magnify his name. But would not the true means of being better acquainted with his glorious attributes, that we might more worthily magnify them, be a more perfect knowledge

The imperfection of our knowledge in natural things.

of the works of creation? It seems that we should be more capable of admiring the magnificence of the Supreme Being, and more effectually glorifying his holy name, were we capable of comprehending the whole, of knowing the perfection of each part, and of discovering all the laws and springs of nature. If we now admire the infinite grandeur of God, when we have but a partial knowledge of his works, what would our sentiments be, how absorbed in the contemplation of his glorious attributes, with what profound veneration should we adore him, if we could fully penetrate and explain all the phenomena of nature!

But, probably, we deceive ourselves by this mode of judging; at least it is certain, that seeing God has not thought proper to give us a more perfect knowledge of nature, it follows, that we may glorify him more with our present powers, than we should do, were we possessed of those which we desire. Ought we to be surprised, that in our present state we cannot discover the first principles of nature? The organs of our senses are too weak to penetrate into the essence of things; nor can we form a coporeal idea of objects which our senses are incapable of discerning. Now, there is an infinite number of things in the world, which our senses cannot discern. When we wish to represent the infinitely great, and the infinitely small in nature, our imagination is confounded. When we reflect on the velocity of light, our senses are incapable of following such a velocity. And, when we wish to form an idea of the veins and circulation of the blood, in those animals whose bodies are supposed to be a million of times less than a grain of sand, we then feel the weakness of all the faculties of our souls. Now as nature ascends from what is infinitely small, to what is infinitely great, need we be astonished that it is impossible to fathom its true principles?

But, supposing God had given us such energy and comprehension of mind, as would have enabled us to take in the universe, with the connexions and relations of all its parts, so that we could penetrate the inmost recesses of nature, and discover distinctly its primary laws, what would be the consequence? It is true, we should then have an opportunity of admiring, in its full extent, the wisdom of God in its arrangement of the world; but this admiration could not last long. In all probability, we should then resemble what men in general now are, who, through their fickleness, continue to admire things only as long as they appear above their comprehension. If we had a clear and distinct idea of the whole system of nature, possibly we might think ourselves capable of forming a similar plan. In short, we might forget the infinite distance between God and us, and cease to render him the glory due to his name.

We have, therefore, no reason to complain of our imperfect knowledge of nature; but, on the contrary, to thank God that it is just what it is. Were the essence of things better known to us, we should not be so affected with them, nor so grateful to God as we now are; nor could we employ ourselves with so much satisfaction

Imperfection of our knowledge in natural things.

in the contemplation of his works as we now do ; as we could not, in that case, be continually making new discoveries. Now, though we have learned only the very first rudiments of the book of nature, we feel the magnificence of the Creator, and our own littleness. At present, every observation, every new discovery we make, fills us with astonishment at the power and wisdom of God : and the desire to arrive at that happy abode, where we shall have a more perfect knowledge of God and his works, continues to be more and more enkindled in our hearts.

O God! guide us by thy Spirit, that we may make a good use of the knowledge thou hast already granted us, and endeavour to grow in it continually! Let not our knowledge be ever unfruitful : but let it excite us more and more to glorify and obey thee! To this end, may we ever remember, that thou wilt not judge us according to the extent of our knowledge, but according to the use we have made of the talents thou hast graciously granted us.

MARCH XVIII.

THE UTILITY OF VEGETABLES.

WHEN we consider the great number and variety of vegetables, we discover, as in every thing else, the beneficent designs of the Creator. What, indeed, could he propose in covering the earth with so many different herbs, with so many plants and fruits, but the advantage and happiness of his creatures ?

There is so great a number and diversity of plants, that upwards of 30,000 species have been already reckoned ; and every day new classes and new species are discovered. Their increase seems infinite : for example, who can help being astonished, when he finds, that one grain of *Turkey corn* produces 2000 others, that one *poppey-seed* multiplies itself so, that in two or three years you may sow a large field with it! Can we suppose, that God has not had the good of his creatures particularly in view, by this prodigious multiplication of plants ? Of this we cannot entertain a doubt, if we consider the use which has been made of vegetables from the most remote times. Do not plants and fruits furnish us daily with the most wholesome and nutritive food ? Do not we owe the greater part of our clothing, houses, and the utensils which afford us so many conveniencies, and so much pleasure, to the vegetable kingdom ?

Every part of a plant is useful. The *roots* furnish us with medicines, food, fuel, pitch, dyes, and all sorts of utensils. Of the *wood*, men make charcoal, buildings, fuel, medicines, paper, dyes, and innumerable multitudes of instruments. The *bark* is of the utmost use in medicine, tanning, &c. The *ashes* are useful to fertilize and ameliorate the soil, to bleach cloth, to make nitre ; and *pot-ashes* are employed in dyeing. The *resin* is useful in painting ; *pitch*, *tar*, and

The utility of vegetables.

balsams, are formed from it. *Turpentine* is useful in medicine; *colophonia*, for varnishing and cement. With *resin*, the bows and strings of musical instruments are rubbed, to render them more sonorous; and *mastic* is used in perfumes. The *flowers* please and comfort, not only by their colours, but also by their odours: they are useful in medicine, and furnish bees with wax and honey. The *fruits* which ripen by degrees, serve for food, and are eaten either raw, boiled, roasted, pickled, &c.

But *vegetables* are not for the use of man alone: they are of the utmost utility to animals, most of which have no other food. Hence it is, that fields and meadows are so multiplied, and that there is such a vast variety of plants and herbs, that the different animals may find what is proper for their nourishment.

Where, O heavenly Father! can we find suitable expressions to celebrate thy goodness? Who can reckon up all the blessings which, at thy command, the vegetable kingdom affords us? It is, at least, manifest, that all the arrangements of thy providence, in this respect, have, for their grand object, the advantage of thy creatures. Thou hast provided for the wants of each individual. Thou hast assigned to each that plant which is most proper for its nourishment and preservation. There is not a plant upon the earth but what has its particular destination and use. What sentiments of veneration and gratitude should we feel, at the sight of the lawns, fields, and meadows! Here thy beneficent care has collected all that is necessary for the comfort and support of the inhabitants of the earth. Here, O God! thou openest thy hand, and satisfiest the desire of every living creature! Here every herb, every ear of corn, every flower, every tree, proclaims thy goodness! I will no longer be deaf, or insensible to so intelligible a voice: I will taste and see that thou art good: I will take encouragement from thy mercy, and repose my confidence more and more in THEE!

MARCH XIX.

THE STRUCTURE OF THE HUMAN BODY.

WITH what marvellous and inimitable art is that muscular substance, which is situated in the cavity of the breast, constructed! It is called the *heart*; its figure nearly approaches that of an obtuse pyramid: and it is so situated that its point inclines a little to the left side. Its substance appears to be a series of fleshy fibres, woven together with admirable art. The external fibres extend from the left side of the heart towards the right; and the internal fibres extend from the right to the left. This substance has two inward cavities, which are called the *ventricles*; and which are separated from each other by a fleshy partition. Here, one vein is found which conducts the blood from the upper part of the body into the right ventricle: another which brings back the blood from the lower parts into that same cavity; an

artery which sends it into the lungs ; another vein, by which it returns from the lungs into the left ventricle ; whence it is distributed all over the body by the great artery. On the side of the right ventricle is a sort of cavity, or muscular bag, which is called the *auricle* ; and which receives the blood before it enters into the right ventricle. Another *auricle*, not less useful, hangs at the left *ventricle*, that the blood may stop there during a new contraction. All the blood passes through the heart, some is continually going in, and coming out : and by the contractions of the heart and the arteries, it is propelled to every part of the body, and circulates through all the veins.

When all the other members of our body are at rest ; the heart is in perpetual motion, from the first to the last moment of our life. In a healthy state, the heart contracts at least 60 times in a minute ; and consequently 3600 times in an hour : and at each contraction it throws out at least two ounces of blood. The force by which this is done, cannot be small : for, in order to propel the blood only two feet in the great artery, the heart must counteract a resistance of 900 lbs. weight, and consequently, in 24 hours, a resistance of 16,000,000 of hundreds weight !*

All these things are equally admirable and incomprehensible. If so much penetration and experience, and so much knowledge and attention be necessary to form some idea of the structure of the heart : how absurd would it be to suppose, that he who formed it was destitute of wisdom ; that he had acted without design, or that it could be the production of blind chance ? O thou immortal God ! I acknowledge thy wisdom and power in the formation of my heart ; and filled with astonishment and admiration, I cannot help exclaiming, Great is the Creator of men ! Great is the Lord our God ! Thy works are admirable and marvellous, Lord God Almighty ; Creator of all things, how infinite is thy magnificence !

What happiness might we enjoy in meditating upon this subject ! May we feel such sentiments as often as we reflect on the wise construction of our bodies ! We should remember the goodness of God, at every breath ; and at every pulsation of our hearts we should, if possible, praise and thank the Author and Preserver of our life. In his hand are all the pulsations of the heart ; and from him proceeds the circulation of our blood. It is by his will alone, that the heart ceases to contract and dilate ; that the blood freezes in our veins, and ceases to circulate ; and that the vital functions are arrested. It is in God alone that we live, move, and have our being. O my soul, never forget the love and gratitude which thou owest to the Most High. May I consecrate myself, and all that I possess, to his service ; and may my heart be ever penetrated with love and respect for his name !

* Calculations of this nature are extremely uncertain : *Borelli* asserts that the force which the heart exerts at every *systole*, is equal to 3000 lbs. weight ; and that which all the arteries exert at contraction is equal to 136,000 lbs. weight ; while Dr. Keil has computed, that the heart at every *systole* exerts a force not exceeding eight ounces !

 Change of seasons.

MARCH XX.

THE CHANGE OF SEASONS'

THE warmest, as well as the coldest climates, have but two seasons in the year which are really different. In the coldest countries, the summer is about four months long; during which their heat is extreme, because of the length of the days. The winter lasts eight months. In these places spring and autumn are almost imperceptible; because, in a very few days, an extreme heat succeeds an excessive cold; and, on the contrary, the most intense cold immediately succeeds the violent heats. The warmest countries have a dry and scorching season, during seven or eight months: then the rains come, which last four or five months, and this rainy season makes the difference between summer and winter.

It is only in temperate climates that there are *four* distinct seasons in the year. The heat of summer diminishes gradually; so that the autumnal fruits have time to ripen by little and little, without receiving damage from the cold of winter. Likewise in spring, plants have time to sprout and grow up insensibly, without being destroyed by the latter frosts, nor too much hastened by the early heats. In Europe, these four seasons are most perceptible; especially in upper Italy, and in the southern parts of France. In proportion as we travel northward or southward, spring and autumn become shorter, and less distinct. In most temperate regions, winter and summer commence in general with copious rains, which continue a considerable time. From the middle of May to the 24th of June, it seldom rains; after which the violent rains return, and continue to the end of July. In the months of January and February the weather is generally very uncertain. If the melted snow, and the rains which fall in the course of a year, were to stand on the earth, without running off or being evaporated, the depth of the water would amount in most places to *one foot nine inches*.

This change of seasons well deserves our admiration. It cannot be attributed to chance; for in fortuitous events there can be neither order nor stability. Now in all countries of the earth, the seasons succeed each other with the same regularity as the nights do the days; and change the appearance of the earth precisely at the appointed times. We see it successively adorned sometimes with herbs and leaves; sometimes with flowers; and sometimes with fruits. Afterwards it is deprived of its ornaments, and appears in a state of death till spring comes, and gives it (so to speak) a resurrection. Spring, summer, and autumn, nourish men and animals, by an abundant provision of fruits; and although nature appears dead in winter, yet that season is not without its blessings; for it moistens and fertilizes the earth: and by that preparation the ground becomes capable of producing plants and fruits in due season.

Awake then, O my soul, and bless and praise God, thy benefactor!
This day that lovely season recommences which opens such an agree-

 Change of seasons.

able prospect of approaching plenty ; and which shall make amends for the dismal days of winter, which are now passing away. Every day the spring approaches with a thousand pleasures, and with blessings innumerable. How many have wished to live long enough to see this renovation of nature ; and to recover, during the beautiful days of spring, from the hardships they had suffered during the winter. But they have not had the consolation to see this day ; and their lives were ended before the winter was over. More highly favoured than thousands of my fellows, who have been removed by death during the winter, I still live, and may rejoice in the blessings which spring produces. But how often have I already seen this season, without thinking of the goodness of my Creator ; and without feeling my heart expanded with gratitude and love ! Possibly this is the last spring I shall ever witness upon earth. Perhaps before the equinox returns, I shall be an inhabitant of the tomb ! May this thought excite me to feel so much the more sensibly the happiness which my Creator has granted me ; and to enjoy, with so much the more precaution, the pleasures of the spring ; and to redeem, more carefully, the fleeting moments of this transitory life !

There is another reflection which the change of seasons may induce me to make. As the seasons succeed each other in nature, so do they in the course of human life ; but with this difference, that those which are past, never return. How many may say, the spring of my youth, which was accompanied with beauty, sprightliness, and health, is no more : the summer and autumn of my life, seasons in which I should show to the world the mature fruits of righteousness, are approaching apace. It is not certain that I shall attain to the winter of old age. It is possible I may die in the vigour of life. Lord, thy will be done ! Provided I receive thy salvation, and persevere to the end in faith and holiness, however short my life may be, it will be found long and happy enough.

MARCH XXI.

OF SEVERAL THINGS WHICH APPEAR USELESS.

IF there be a wise providence which governs the world, it must extend itself to the smallest things, and the most trifling events ; that nothing may occur under its government which is not of manifest utility. "But, how many things are there in the world which are of no use ! The north wind blasts and disperses the blossoms of the trees ; they wither, and are of no use : seeds, which might have produced new plants, perish without bringing forth fruit. Innumerable multitudes of insects are not only of no use, but are injurious to man, to beasts, and to vegetables. Many men, and other animals, only show themselves on the earth, and then suddenly disappear. Others are born either deformed or monstrous, or become impotent. How many

Several things which appear useless.

faculties and talents are lost, for lack of being employed? How many good projects, and useful enterprises fail, before they come to their maturity? Could all this take place if a Being infinitely wise governed the universe?"

But hast thou, who darest to doubt the being and providence of God, a perfect knowledge of all things, and the relations they have among themselves, to be able to say, this is injurious; that is absolutely useless? Never forget that thy knowledge is weak and limited. Thy duty is, to observe a respectful silence; to adore, and not to cavil at the works of the Lord, who has given so many proofs of his wisdom in that infinite number of things, the utility of which is so manifest, as to be perfectly known to us. Consider also, that a thing may be useful in different ways; and that, while it serves one purpose, it is not to be expected to serve another. The insect that at its birth becomes the prey of swallows, certainly cannot produce a new generation. The efforts which the alchemist makes to find out the philosopher's stone, are certainly of no worth in the formation of gold: but the insect is useful in the nourishment of swallows; and to the experiment of the alchemists we owe various excellent medicines, and that beautiful porcelain which is so much in present use. Your tears cannot soften that ferocious and cruel man, who abuses his power in oppressing the weak; but although your intercessions in behalf of the miserable man are of no effect, they serve to keep up the sensibility of your own heart; and there is a Being who collects these precious gems, to ornament that crown with which your head shall be one day decorated.

Let us never suppose that there is any thing in the world entirely useless. There may, indeed, be certain things which do not appear to succeed, nor answer that end for which we suppose them designed; but they undoubtedly serve the end which God proposed; and accomplish it in the very way he designed. There may be also certain cases in which God does not appear to accomplish the end which he has proposed. In order that particular matters may take effect, and be realized, it is possible that some others should, in a manner, fail, and be defective. But if it be incontestable that true wisdom does not only employ itself about the present, but extends its views to the future; if God be infinitely wise, and if his wisdom should be manifested in the world as in a mirror; then there must occur a number of things here below, which considered separately, may appear not to accomplish their destination perfectly, because they were designed to do it only in conjunction with others. The share these things have in the execution of the whole plan, may be so little known, or so imperceptible, as entirely to escape our notice. But surely it does not follow from this, that they do not contribute to it, or are utterly useless. On the contrary, we should conclude that God could not be infinitely wise, and that he did not act on a well-ordered plan, if there did not frequently happen things which, to us, appear useless.

Several things which appear useless.

A persuasion of this kind will contribute much to our peace and happiness. Day by day events take place in nature, and in the course of human life, the connexions and relations of which appear to us incomprehensible; and which we may be tempted to think useless and without design; and it is natural that those things which weaken our confidence in God, should be disagreeable and distressing to us. But the more we are convinced by reason, daily experience, and the declaration of the word of God, that he is infinitely good and wise, the more contented and tranquil we shall be, both in prosperity and adversity. It will not then be difficult for us to acknowledge, that in all that he does, and in all that he permits, he proposes to himself the accomplishment of infinitely wise ends, which in one way or other promote the good of the universe. When we see many little, and apparently useless, things in nature; so many events which appear inexplicable, or even entirely contrary to the divine plan: far from finding fault, we shall adore his infinite wisdom, and give the glory that is due to Him, who doth all things well. He is never mistaken in the government of the universe: all that he does, all that he permits, is justified by the event. Let us refer every thing to his infinite wisdom, and ever trust in its direction, without ever having the rashness to cavil at its dispensations. This submission and dependance are the only means of happiness here, and glory hereafter.

MARCH XXII.

THE HARMONY WHICH SUBSISTS BETWEEN THE NATURAL AND MORAL WORLD.

THE wisdom of God has established the greatest affinity between the earth and its inhabitants, to show that the one was manifestly made for the others. There is a mutual connexion between, and perfect harmony in, all the works of the Most High. Human nature, and the surface of the earth, have the most evident connexion, and the most striking analogy. As the bodies of animals and plants are formed, grow up, come to maturity, and perish; so also are the bodies of men subject to the same laws of nature. As there is a great diversity of climates and soils, some of which are fertile, while others are barren; there is a similar variety in the minds, talents, and faculties of men. Such has been the plan of the great Creator; and in this diversity there is more goodness, and wisdom also, than at first view appears. Far from being defective, we should find nothing but beauty and perfection in it, if we had a thorough knowledge of things.

Should any one be tempted to object, "Why then has not God given the same faculties, and the same degree of intellect, to all men?" We may answer, Who art thou, blind and frail mortal, who callest God to an account for his works? Shall the creature say to the Cre-

ator, Why hast thou made me thus? We might as well ask, Why has not God so ordered matters, that all nations and places on the earth should be alike pleasant and fertile? Why do we find, in one place, a rich and fruitful soil, while another is so barren and ungrateful that all attempts to improve it are thrown away? This diversity is, without doubt, just and good; and highly worthy of our admiration, though not always conformable to our mode of thinking. The most barren and desert regions have their beauty and use, in the eyes of the Creator: it is the same with the less cultivated and savage nations: all hold that rank which is proper in the immensity of created beings, and their diversity points out the infinitely varied wisdom of God. *Eph. iii. 10.*

But as it is manifestly the intention of the Divine Providence that the earth should be cultivated, and that it should produce an abundance of fruit for the preservation of men and animals; and as it is for this end that he has given us corn to sow the earth; so also, and with still more reason, it is agreeable to his wisdom that human nature should be cultivated; that our souls should be rendered fruitful, and brought into a capacity to produce an excellent harvest of virtue and holiness. It is with this design that he has given men lessons of true religion, which, if they find a soil well disposed to receive them, will produce exquisite fruit, like the corn that is sown in a fruitful field. Hence it is, that the Gospel produces its effects in proportion to the natural capacities of men; and the dispositions with which they receive it.

There are still, in our days, vast tracts of uncultivated and barren land, although Providence denies such regions nothing which is requisite to render them fertile. It is thus, that notwithstanding the publication of the Gospel, there are so many nations which still remain in ignorance. And, even among the most polished nations of Christendom, the influence of the Gospel is very different, and ever will be, according to the diversity of character of those to whom it is preached. Some do not comprehend it, and have no notion of the saving power of the truths of our holy religion. Others receive these truths with joy and eagerness; but the impressions they receive are not of long duration. Among others, earthly appetites and worldly cares, choke the divine word. Finally, there are others, but these are the smallest number, who receive the seed in an honest and good heart, with light, contrition, and sincerity; to these alone it is the power of God unto salvation. *Rom. i. 16.*

Reader, to which class dost thou belong? What impressions has the doctrine of salvation made upon thy soul? What fruit has the good seed of the Gospel produced in thy heart? These are questions which thy conscience should answer honestly and sincerely. But the whole course of thy life will give the best answer.—What then does it say?—

MARCH XXIII.

THE NATURE AND PROPERTIES OF AIR.

AIR is a subtile and fluid substance, which surrounds every part of our globe; and which all living creatures respire. Although it is so near us, surrounds us on all sides, and we continually feel its effects; yet we have not a full knowledge of its nature. This, at least, we know, that it is a corporeal substance, of which we may be convinced, by rapidly moving our hand backwards and forwards; as we shall then feel a considerable resistance from it. It is not less certain, that the air is fluid, that its parts do not cohere, but pass easily by each other; and by this means yield to all kinds of impressions. If it were a solid body, we could neither breathe nor pass through it.

Gravity is a property common to the air with all other bodies; and this is to water as 1 to 800; but its weight is nevertheless very considerable: every square inch of the surface of the globe is pressed by a column of air 15 lbs. weight: every square foot, by one of 2160 lbs.: and a middle sized man, whose surface is about 14 square feet, carries a load of atmospheric air equal to 30,240lbs. weight! This may appear incredible: but the resistance of the air which is within our bodies, prevents us from feeling the pressure of the external air; for that air which is pent up in our bodies, maintains an equilibrium with that which acts upon us in all directions.

Elasticity is another manifest property of the air. It has a continual tendency to dilate itself, and to occupy a larger space: and although it may be easily compressed, yet as soon as the pressure is removed, it immediately expands. Fire and heat show this property of the air; and by these means it may be made to occupy a space 550,000 times greater than that which it occupies in its common atmospheric state; nor does it lose the smallest portion of elastic power by this amazing expansion.

All these are wonders highly deserving our admiration: and in them we may find the causes of a multitude of astonishing effects. It is the air which supports our globe, and keeps it in its orbit.* It is in the air that the clouds are collected, which assume so many different forms and colours; and which, according as they are condensed or rarified, suspend the vapours, or precipitate them in rain, hail, or snow, upon the earth. Without the air, our senses could be of no use to us: our lives, and the lives of other animals, could not be supported: and without it, neither fire nor water could exist.

Thus then the air also announces the grandeur, power, and goodness of God. His infinite wisdom alone could adapt this element to so many uses. It is God who is the creator and governor of the

* The doctrine contained in this sentence may be objected to by some, as appearing contrary to the received principles of *gravitation* and *attraction*. Let them take the author's words: *Die Luft ist es, welche den Erdboden tragt, und ihn in seinem stands, und in seiner Bahn erhalt.*

 Nature and properties of air.

rain, the snow, the winds, the thunders, and the lightnings. He alone has made all these things. Let us adore the depths of the riches of his wisdom and understanding, which manifest themselves with so much splendour in the whole economy of nature. With what wisdom has he measured the quantity, gravity, elasticity, and motion, of the air ! With what goodness does he cause it to serve an infinity of purposes to the welfare of our globe ! Can we who every moment breathe this air, so necessary to the preservation of our lives ; who experience so many beneficial influences from it ; can we be ungrateful to our God for the tender care which he has manifested to us, in giving us such blessings ? This ingratitude would indeed render us unworthy of the air we breathe. Rather let us unite our voices to those of all his creatures, and celebrate his praise. Let us propose, with the *Psalmist*, to sing unto the Lord as long as we breathe, and magnify his name as long as we have any being ! Praise the Lord, O my soul ! Hallelujah !

 MARCH XXIV.

THERE IS NOTHING NEW UNDER THE SUN.

IT is certain, that in respect to us, many *new* things happen in the earth. In every season, nature produces new flowers, and ripens new fruits. The whole face of nature changes annually. Every day brings forward new events, and new revolutions. The situation of objects changes daily : or rather they present themselves to our senses under different forms.

But, it is only relatively to our limited understanding and knowledge, that it is true, that there is any thing *new* under the sun : and on this ground nothing is more certain than that proposition of Solomon, *What has been, will be ; and what has been done, will be done ; and there is nothing new under the sun.* God, whose wisdom is infinite, has not seen good to multiply beings without necessity. There are as many as are necessary to satisfy our wants, and gratify our desires, and our curiosity. Far from exhausting, we cannot even gain a superficial acquaintance with the works of the Creator. Our senses are not refined enough to perceive what God has formed ; our understanding is too weak to form a just and perfect idea of the whole creation : hence, we often believe that there are many new things under the sun : for, as the empire of nature is immense, and as we cannot take in all its aspects at one view ; we suppose each point which we perceive for the first time, to be new ; because the Creator has provided an astonishing variety of natural beings, the component parts of which are extremely diversified.

Nature does not require a continual and endless creation ; it is enough that the Supreme Being should preserve the order which he has established in the beginning. God is an artist who requires but a small number of springs to vary the works which he has made :

Nothing new under the sun.

and though they succeed each other, and return in the most exact order; so infinitely diversified are they, that they appear to us always new. Let us be contented to enjoy, with gratitude, the things which he has created, without undertaking to sound their depth, or comprehend their vast extent.

The impossibility of numbering the works of creation, may be considered, in some measure, as the *seal* by which we may know the world to be the work of God; and which is, at the same time, an evident proof of the weakness of our own understanding.

But, have not many discoveries been made in modern times, which were wholly unknown to the ancients? Do not all the kingdoms of nature present to us phenomena of which formerly we had no idea? The greater part of these discoveries is less owing to our sagacity, than to our wants. In proportion as these were multiplied, new means were necessary to supply them; and Providence condescended to furnish us with them. But these means existed before we discovered them. Minerals, vegetables, and animals, which we have lately found out, existed already in the bosom of the earth, or on its surface, before the inquiries and labour of men placed them before our eyes. Besides, it is probable, that many of the discoveries we boast so much of, had been made, or at least foreseen, by the ancients.

Were the world the work of chance, we should frequently see new productions. Why do we not see new species of animals, plants, and stones? Because all has been planned by the infinite wisdom of God. Every thing which he has made, is so well made, that it has no need of being created again. What exists is sufficient for our necessities and comfort. Nothing has been formed by chance; but every event has been determined in the council of infinite wisdom, and all inseparably connected together. The whole edifice of the world is preserved by the government of its Creator, and by the concurrence of general and particular laws. All is stamped with wisdom, regularity, and magnificence. In all, and through all, God is magnified and glorified; and to him be glory eternally! Amen!

MARCH XXV.

CAVES IN THE MOUNTAINS.

CAVES are generally found in mountains; and few or none in plains. They are formed, like precipices, by the falling in of rocks; or like unfathomable pits, by the action of fire. Caves, therefore, may be produced by the same causes which produce chasms, tremours, and fallings in of the earth; these causes are the explosions of volcanoes, the action of subterranean vapours and earthquakes; for they occasion disorder and sinking of the earth, and so necessarily form caverns, holes, and chasms of all sorts.

But of what use are these caves; what purposes do they answer? Suppose we could discover no good end they answer, we should, ne-

Caves in the mountains.

vertheless, be persuaded that they are formed for wise purposes. For, as there is nothing on the earth useless, we may take it for granted that caves have their uses also ; and it is not very difficult to discern the end which they answer. In them the waters are collected, which are afterward distributed over the earth, when there happens a deficiency of rain ; and they feed the watercourses in subterranean canals. As soon as this circulation is stopped, shocks and earthquakes, which spread terror and desolation over our globe, take place. The air shut up in the interior parts of the earth, escapes by these caverns. Such openings, therefore, are necessary, that the air may penetrate into the mountains, give a free passage to the winds, and a vent to the exhalations. For, if the openings of caverns and their vent holes did not give a free circulation, the air contained in them would become corrupted, and cause shocks and earthquakes.

Often these caverns fill with water, which afterward forms rivers and lakes. Such is the lake called the *Zirchnitzer See*, about six German miles from *Lobac*, in the dutchy of *Carniola*, in *Austria*, which fills regularly in June, and dries up, or is lost under the neighbouring mountains, in September. This lake then is sometimes navigable, and at other times arable ! So that the inhabitants of that country may plough, sow, reap, and hunt in it !* And how many animals must perish, if the caves of the mountains did not serve them as places of shelter and retreat during the winter ? Were there no caves, we should be deprived of various minerals, and various other useful productions, which either cannot be formed elsewhere, or come to their perfection only in subterranean cavities.

We see then, that even in this respect, the wisdom and goodness of God are insensibly manifested ! and we have an additional proof, that there is nothing useless in nature ; nothing too much, nothing which is not made in wisdom, or designed for the general good. The more we are employed in these researches, and the more we exercise ourselves in them, the more we shall adore the sublime perfections of God in the works of nature. Let us enter more deeply into those noble meditations ; and let it be our most agreeable occupation to admire and celebrate the power and goodness of our Creator, at the sight of the different objects and phenomena which we discover on, or under the earth.

MARCH XXVI.

THE CIRCULATION OF THE SAP IN TREES.

THE trees, which for several months appeared entirely dead, begin insensibly to revive. In a few weeks we shall discover more signs

* Of this lake, with a probable theory of its phenomena, an ample description may be found in the xvi. vol. of the *Philosophical Transactions*. It is the only place, perhaps, in the world, where the singular animal the *Anguine Siren* is bred.

Circulation of the sap in trees.

of life still. In a short time the buds will grow larger, open, and expand their precious blossoms. We have observed this revolution regularly in the commencement of each spring; and perhaps have been hitherto ignorant of the means by which it was performed. The effects which we observe in spring, in the trees, and other vegetables, are occasioned by the sap which is put in motion in their tubes, by the air, and the increasing heat. As the life of animals depends on the circulation of their blood; so likewise the life and growth of plants depend on the circulation of the sap. To effect this, God has formed and adjusted all the parts of vegetables, so as to concur to the preparation, preservation, and motion of this nutritious juice.

It is principally by the *bark* that in spring the sap ascends from the root into the body of the tree; and that even through the year, life and nourishment are distributed to the branches and the fruits which they bear. The woody part of the tree is composed of small longitudinal fibres, which extend in a spiral line from the root to the top of the tree; and which are very closely united together. Among these fibres, there are some so very small and fine, that one of them, which is scarcely as large as a hair, contains more than eight thousand fibrillæ! There are an innumerable multitude of little tubes, which contain the nutritious juice, and which facilitate the circulation. These tubes extend through all the branches, and ascend to the very top of the tree. Some conduct the sap from the root to the top; and others bring it down again to the root. The sap rises through the ascending tubes, during the heat of the day; and comes back, by the descending ones, in the cool of the evening.

The leaves answer the same end: their principal use is to concoct the sap; not only that which proceeds from the root, but also that which the tree receives externally by means of the dew, the humidity of the air, and the rain. This nutritious juice is distributed through every part of the tree; but it could not ascend by the tubes, if they were not open at the top: and it is through these pores that the watery parts of the juice evaporate; while the oily, sulphureous, and earthy particles, are united together, to nourish the tree, to be transformed into its substance, and to give it a continual increase. If the juices cease to flow; if the circulation be obstructed; if the internal organization of the tree be injured, either by intense cold, frost, old age, a wound, or other external injury, the tree dies.

After these reflections, can we in this season behold trees with the same indifference as formerly? Can the change which is about to take place in them be unworthy of our attention? And can we observe the renovation of nature without thinking of that God who has given life to all his creatures; who provides juices suitable to the trees; who communicates to the sap the power to circulate in the vessels; and to distribute nourishment, life, and growth to the trees? Alas! we are a full proof, that it is possible to see these things every year, and yet to pay no proper attention to them. For many years, at the return of spring, we have had the opportunity of observing this

Circulation of the sap in trees.

vivifying power, which shows itself in plants and in trees : but we have paid as little attention to it as the beasts which graze on the plains. And what is yet more astonishing is, that we have been equally inattentive to the preservation of our own lives, to the growth of our bodies, and the circulation of our blood ! As we have the happiness of seeing another new spring ; may we reflect on it in a more rational and Christian manner ! May we recollect, that God is nigh to us in every part of his works : and that each of his creatures proclaims his magnificence ! But all our wishes will be fruitless, if the Lord himself, who is the God of all grace, do not incline our hearts to know and glorify his great name.

While nature is reanimated, grant, O God, that our souls may be quickened by thy Spirit ! Let this new existence which all the vegetables receive in this beautiful season, be the signal which shall cause us to awake from our slumber, and excite us to walk before thee in holiness ; to lead a life of spiritual activity, agreeable to thy will : and duly to feel, and worthily to magnify, thy power and goodness ! May this be the sacrifice which our souls shall present unto thee in these days, which give us such bright prospects of future good ! Amen.

MARCH XXVII.

OUR IGNORANCE OF FUTURITY.

IF we are ignorant of future events, we must not seek the cause in the nature of our souls only, whose faculties are so very limited ; but also in the express and infinitely wise purpose of the Creator. He knew the strength of man, and would not give him more knowledge than he was able to bear.—Knowledge is to the soul what the light of the sun is to the eyes : too great a splendour would be injurious, without being useful. It would be very dangerous to the virtue of men, if they had the faculty of foreseeing what would happen to them. For, external circumstances have always some influence on our mode of thinking, on the purposes of our minds. Thus, the more future events should be known to us, the more temptations we should have to surmount ; and the more we should fear for our virtue. How miserable would man be, could he see into futurity !

Let us suppose that future events should all be pleasant and prosperous ; so long as we do not see that greater happiness which awaits us ; so long we enjoy, with pleasure and comfort, the present advantages which we possess. But, draw back the curtain, and give man a pleasing prospect into futurity ; and he will immediately cease to enjoy his present blessings. He will be no longer contented, happy, or thankful. He would anxiously and impatiently wait for those blessings designed for him ; and his days would be spent, one after the other, without being enjoyed. But suppose that future events were

Our ignorance of futurity.

to be gloomy and afflictive!—we should feel all their misery from the time we foresaw them. The days which might have been spent agreeably in peace and tranquillity, if the future had not been known to us, would be consumed in depression of mind through the dreary expectation of a certain evil. In a word, the idea of the misfortunes which awaited us, would prevent us from enjoying our present happiness; and render us insensible to the blessings we now possess. How wise and good is God, to have hidden the future from our view; and only to have given us a knowledge of our lot by degrees, as the intended events occur!

Let us never desire to anticipate the happiness which awaits us; nor feel the weight of our misfortunes before they arrive. On the contrary, let us as often as we think of futurity, thank God that our ignorance of it saves us from so many inquietudes, anxieties, and fears. And, why should we wish to see through the veil that hides the future from our eyes? If we be certain of our reconciliation to God through the Redeemer, we may rest assured, that all future events, whether prosperous or adverse, shall infallibly work together for our good. And is it not a reconciled and gracious God who directs all events, and who regulates the future? He sees at one glance the whole course and circumstances of our lives; not only that portion which is already past; but all that is before us, even into the abyss of eternity. When we lie down to sleep, let us commend ourselves to the care of our heavenly Father, without being disturbed about what may happen during the night. When we awake, let us commit our bodies, souls, and concerns, into his hands, without being anxious about the events which may mark the day. In the midst of the dangers which surround us, and the dangers which threaten us, let us remember the goodness of God, and trust in him; and he will either turn them aside, or turn them to our advantage. And although we know not what evils await us in future, we need have no anxiety on that account; God knows all, and will take care to comfort us in them, and support us under them. Therefore, to this wise and merciful Disposer of all events, let us abandon ourselves, and trust all our concerns with the utmost confidence.

“Whatever God has determined, in respect to us, must necessarily happen. It is the lot of his choice, and that which is most suitable to us. Shall I not receive the cup which he presents, without reluctance or murmuring, seeing I am convinced that it is for my good? O Lord, I put my cause into thy hands, and submit cheerfully to whatever it shall please thee to determine, concerning my life or death. Whether I live or die, be thou my portion in time and eternity! Be submissive, O my soul! thy glory is to resign thyself entirely to the will of thy Creator. Let the will of the Lord be done; he is my heavenly Father, and will conduct me safely through all dangers, to that happiness which he has allotted me.”

The gradual approach of night.

MARCH XXVIII.

THE GRADUAL APPROACH OF NIGHT.

AS night itself is a blessing from the Creator, it is wisely and mercifully ordered that it should come on by degrees. A sudden transition from the light of the day, to the obscurity of the night, would be equally inconvenient and frightful. So quick a revolution would cause a sudden and general interruption in the labours of men, which, in certain matters necessary to be completed, and not admitting of delay, must be very prejudicial. Universal nature, men, and animals, would be seized with terror; and it would be impossible for the organs of sight not to suffer considerably by this sudden transition from light to darkness. Darkness, therefore, does not take place suddenly; it comes on with slow steps; and the twilight which precedes the night, gives us time sufficient to terminate our most urgent business, and to make all our necessary arrangements. By this means, the coming of the night does not disturb and incommode us, as we have timely warning to prepare ourselves for it.

But, whence do these remains of light proceed, which, at the end of each day, temper and soften, in some degree, the gloomy aspect of the night? We no longer see the sun; yet a portion of his pleasing light still cheers us. Let us in this, also, admire the wise and beneficent arrangement of nature. The atmosphere, which surrounds us, has been so constructed as to render us this essential service. The rays of the sun, which are projected on the superior part of the atmosphere, do not continue their course in a right line, but are bent; and this leads them whither their first direction would not have carried them. The atmosphere, having thus bent and turned back a great number of rays, which, without this, could not have reached the surface of the earth, brings them to our eyes; and by this means we enjoy the light much longer, and the time of labour is considerably lengthened out.

Thus a gracious Providence has regulated, not only the great revolutions of the seasons, but also the daily change of light and darkness, in a way the most advantageous to us. Let us acknowledge then, with thanksgivings, the goodness of our Creator, and adore his wisdom in that arrangement, which is so beneficial to us. Let the gradual approach of night, in the inanimate part of nature, remind us of the approach of the evening of life. *It* also comes on by degrees; and almost without our perceiving it, we shall be encompassed with shadows of death. God grant, that our great work may be then happily finished: and that we may have accomplished the task which has been allotted us! We must work while it is day; the night cometh in which no man can work.

The magnificence of God in his works.

MARCH XXIX.

THE MAGNIFICENCE OF GOD IN HIS WORKS.

WHY are the works of God so magnificent? Why is there so much splendour in all that we see? Why do we discover, on all hands, so many different and innumerable objects, one of which appears still more beautiful than the other, while each has its peculiar and appropriate charms? Whence is it, that we every where find new subjects of astonishment and admiration? It is, doubtless, that we may incessantly admire and adore this great Being, who is infinitely more beautiful, sublime, and magnificent, than all we can discover or admire in nature: it is, that we may be enabled to say to ourselves continually, "If the *works* are so glorious, what must the *workman* be?" If the beauty of the creatures be so exquisite, how inexpressible must be the beauty and infinite grandeur of God, who has formed them all, and sees the whole creation with one glance of his eye!

If the sun have a splendour which our eyes cannot endure, can we be surprised if He, who lighted up this globe, dwell in light inaccessible, which no man has seen, or can see? Can he be less glorious, than the creatures he has formed? The more marvellous his works are, the more he should excite our astonishment and admiration. If we could see *his* grandeur, he could not be *God*, or we should not be *men*. How then can we better enlarge our views, or lay up a richer treasure of ideas and knowledge, than in contemplating this God, whose grandeur and magnificence are without bounds? And is it not by such a contemplation, that all the faculties of our souls may acquire that strength and energy which shall render us capable of enjoying an infinite happiness? The more the capacity of our minds is extended here, the more ennobled will they be, in contemplating this greatest of beings, and the better able will they be to comprehend him in the future world.

Let us, therefore, divide our attention between God and nature, that we may in the latter, as in a glass, contemplate the image of that Being which we cannot see face to face. Let us collect the various beauties and perfections which are dispersed over the vast empire of creation; and when their innumerable multitudes have struck us with astonishment, we may say to ourselves, these, compared with the perfections of the Creator, are but a single drop to the ocean. Let us consider, in created beings, only what is beautiful and lovely, abstracting what is finite and limited, that we may be able to form a more just and worthy idea of the excellence of the Ruler of the universe; and when a sight of the faults and imperfections of the creatures shall have lessened our admiration of their beauty, let us exclaim, "If creation be so beautiful, notwithstanding its defects, how great and worthy of our admiration must He be, whose splendour is without spot, more pure than light itself, and more brilliant than the sun!"

The magnificence of God in his works.

Then, O my soul, collect all thy powers, and employ them only in the worship of the adorable God! Take no rest till thou hast taken this flight towards the unlimited perfections of Him, who is infinitely exalted beyond the most perfect of creatures. Let thy principal study be to learn to know God, because there is nothing greater than God, and because this knowledge alone will satisfy thy desires, and fill thee with a peace and joy which nothing can disturb, and which is even a foretaste of that more perfect knowledge, with which thou shalt be favoured at the foot of his throne, and which shall constitute thy happiness through all eternity!

Yes, my God, and my King! I will exalt and bless thy name for ever and ever! I will bless thee while I live, and celebrate thy praises to eternity. I will speak of the glorious magnificence of thy majesty and of thy marvellous acts; to the end that men may celebrate the prodigies of thy power and goodness, when I shall have told them how great thy magnificence is. My mouth shall publish the praises of the Lord, to the end that all men may bless thy holy name, both now, and for evermore.

MARCH XXX.

THE ORDER OF THE SEASONS IN THE OTHER PLANETS.

THE diurnal rotation of the earth round its own axis, and its annual revolution round the sun, afford us the greatest advantages. Does not this authorize us to suppose, that the other planets have similar advantages. All, except *Mercury*, have been observed to move round their own axis, and very probably *he* does the same, though this motion cannot be observed in him. All the planets move in orbits round the sun; and even the secondary planets have a similar revolution round their primaries. Now, as the diurnal rotation of the earth, produces the constant changes of day and night; and its annual motion, the change of seasons; it is very likely that the same things take place in the other planets.

Venus turns round her axis in 23 hours, and 22 minutes; *Mars*, in 24 hours, 39 minutes; *Jupiter*, in 9 hours, 56 minutes; and *Saturn*, in 10 hours. The *Moon* is supposed to turn round her axis in the same time she turns round the earth. If, therefore, we divide the day into twenty-four equal parts, each of which parts shall be called an hour, the hours of *Venus* shall be a little less; and those of *Mars*, a little greater than those of ours; those of *Jupiter* and *Saturn* will not be half so long as those on our earth. As to those of the *Moon*, each will be more than equal to a whole day of ours. It is also worthy of remark, that the axis of the planets are *inclined* like that of our earth: whence it necessarily follows that their northern parts, during their revolution round the sun, are sometimes more, sometimes less enlightened. Is it not then very likely, that the different seasons, and alter-

The order of the seasons in the other planets.

nate length and shortness of days and nights are known on these planets, as well as on ours?

But it may be asked, to what purpose are all these reflections? They would, indeed, be useful, if they only served to increase our knowledge. But they will appear more important to us, if we consider the consequences resulting from them. May we not conclude, from what we have seen, that the other planets are also inhabited with living creatures? All the planets are like the earth:—like our globe, they are illuminated and warmed by the sun; they have their days and nights, their summers and winters; but of what use would all these be, were the planets not inhabited.

What an idea should this give us of the magnificence of the Creator! How extensive in his empire! how impossible is it to fathom the wonders of his power and goodness! When we consider all these globes on which his glory is probably as much manifested as on ours, we must be struck with astonishment, and adore him with sentiments of the most profound veneration. Though he should receive no honour from the inhabitants of this earth, his praises would undoubtedly be celebrated in all those worlds which roll above our heads. But shall we permit any to surpass us, in celebrating the praises of the Lord? No! in a holy emulation, let us join our hymns to those of the inhabitants of other worlds, and celebrate him with eternal thanksgivings! Let us invite all beings, who, like us, have proceeded from his hands, to magnify the Most High! The Lord, he is God! The Lord, he is God! Let us render to him the glory due to his name! Hallelujah! Amen.

MARCH XXXI.

THE PATERNAL CARE OF PROVIDENCE, FOR THE PRESERVATION OF HUMAN LIFE, IN EVERY PART OF THE WORLD.

WE know, at present, a great part of our globe; and from time to time we discover new regions. But no place has been discovered, in which nature does not produce what is necessary for the preservation of human life. We know countries, where the sun burns up almost every thing; where little is to be seen but mountains, and plains of sand: where the earth is almost entirely despoiled of that verdure which adorns it so beautifully in these climates. There are other countries, where the rays of the sun, and his benign warmth, are rarely felt; where an almost continual winter benumbs every thing; where there are neither fruits, crops, nor cultivation. Notwithstanding, both men and animals are found there, who are far from being destitute of subsistence. The productions which Providence has denied them, because they would either be burnt up by the ardour of the sun, or frozen by the rigour of the cold, are supplied by presents more suitable to those climates, on which both men and animals can

live. The inhabitants carefully seek what nature offers to them; they know how to appropriate it to their use; and thus they procure all the necessaries and conveniencies of life.

In *Lapland*, Providence has so contrived matters, that even an evil, very troublesome to the inhabitants, becomes the means of their preservation. In that country are found innumerable multitudes of gnats, which, by their stings, are the scourge of the Laplanders; and from which they cannot defend themselves, but in keeping up a continual thick smoke in their cabins, and in daubing their faces with pitch. These insects lay their eggs on the water, and thus allure a vast number of water-fouls, who feed on them; these are taken by the Laplanders, and become their principal nourishment.

The *Greenlanders*, in general, prefer animal to vegetable food; and it is true, that very few vegetables are to be found in those barren countries. However, there are some plants, of which the inhabitants make great use, particularly *sorrel*, *angelica*, and especially *spoonwort*, or *scurvygrass*, (*cochlearia*.) But their principal nourishment is a species of fish, which they call *angmarset*, and which nearly resembles the *miller's thumb*. After they have dried these upon the rocks in the open air, they constantly serve them instead of bread and pulse; and they lay them up for the winter in large leathern sacks, or in old garments. In *Iceland*, where also there is no agriculture, because of the intense cold, people feed on dried fish, instead of bread. The *Dalecarlians*, who inhabit the northern parts of Sweden, having no corn, make their bread with the barks of *birch* and *pine*, and a certain root which grows in the marshes. The inhabitants of *Kamschatka* feed on the stem of the *acanthus*, which they eat raw, after having peeled it. In *Siberia*, they make much use of a species of lily, which they call *mortagon*.

Adorable Father of men! how tender are thy providential cares for our preservation! With what goodness hast thou dispensed, to every part of the earth, what is necessary for the subsistence of thy creatures! Thy wisdom saw, before the foundation of the world, the dangers to which the life of man would be continually exposed; and it has so contrived matters, that every where a sufficiency of nourishment is found. It has established such relations, such connexions and communications, among the inhabitants of the earth, that the people who are separated by the most extensive seas, labour for each other's subsistence and convenience.

Can we sufficiently admire and adore the Divine Providence, which has given us bodies formed in such a way, that they are not confined to any particular food, but are able to make use of every kind of aliment? Thus, by a goodness which we cannot sufficiently praise, man does not live by bread alone, but by every word, (appointment, and ordinance) which proceeds from the mouth of God; that is, by every thing which God has ordained nature to produce, to which he has given a nourishing virtue. And, because he opens his hands to satisfy the desire of every living creature, all turn their eyes to him, and expect

Care of Providence for the preservation of human life.

to receive their proper nourishment in due time. This month, which ends to-day, furnishes us with another proof of this. Compassionate and merciful Father! let us praise thee with our latest breath, for the many blessings, and means of subsistence, with which thy liberal hand has supplied us!

MARCH XXXI.

A HYMN OF PRAISE.

MY soul, in thy lov'd presence, Lord,
Its many mercies shall record;
With thankful transport will I sing
The goodness of my God and King.

O, why should God, the Great, the Just,
Regard poor palpitating dust?
Weak worms! We nothing call our own,
Dependent on his love alone.

Who stretch'd yon canopy on high,
Th' etherial curtains of the sky?
Who spread on earth the verdant robe,
And beautified this lower globe?

Who clothes the hills, the fields, the vales?
What pow'r the rain, the dew, exhales?
Who bursts the seed consign'd to earth,
And swells the new botanic birth?

Who teaches Sol his daily track?
Who brings the splendid trav'ler back?
By whose command, at night's return,
Fills Luna her diminished urn?

Whose hand with blessings crowns the year,
And fills our hearts with joy sincere?
Who, when his loudest thunder rolls,
Not less delights in humble souls?

O man, belov'd, thy life review,
Say, who thy watchful helper, who?
From youth to age, what guardian pow'r
Preserv'd thee to the present hour?

O Sovereign Ruler, mighty Lord,
Thy great salvation we record;
Thy bounty all our gifts bestow'd;
We are thy people, Thou our God.

A hymn of praise.

Thy truth and goodness, how they shine !
 How dear thy providence divine,
 Which kindly counts our number'd hairs,
 And all our mortal suffering shares !

Thy goodness to the clouds extends,
 All being on thy love depends :
 The callow raven, when he cries,
 Thy hand with daily food supplies.

O Friend of man, essential Sire,
 The human offspring Thee admire ;
 Their mourning minds thy pity cheers,
 Thy love paternal counts their tears.

God, from his high supernal seat,
 Beholds the creature at his feet,
 With eye of soft compassion sees
 An humble mourner on his knees.

Rise, O immortal spirit ! rise,
 Remount, regain thy native skies ;
 Aspire to thy Creator, God,
 Pure fountain whence thy Being flow'd.

My soul, with rapt'rous faith adore ;—
 Sing praises, sing for evermore ;
 Forget not all his gifts to tell ;
 God has for thee done all things well.

T. R.

APRIL.

APRIL I.

A HYMN FOR SPRING.

PRAISED be the Lord, who has created the spring ! To God be glory, who has adorned the face of the earth ! To him be glory, honour, and power, for he makes the beings which he has formed happy. The Lord has created, the Lord has preserved, the Lord loves and blesses this world, the work of his hands ; celebrate him, all ye creatures !

In those happy days, in which man had not yet rebelled against his Maker ; free from sin, and the punishment due to it, the earth was a paradise. Now, though sin and punishment have deformed it, we still see in it the hand of its sublime Author, and earth is yet the entrance to heaven.

A hymn for spring.

The fields, which seemed dead, begin now to revive and bloom. Every day brings new blessings ; the worm which creeps in the dust, and the fowls that fly in the air, rejoice in their existence.

The face of the earth is renewed ; the sky shines with a pure and serene splendour ; the mountains, the vallies, and the forests, all resound with melodious accents : and He to whom all things owe their being and their life, looks with an eye of mercy over the works of creation.

And yet, O Creator ! the meadows and fields are destitute of intelligence ; and thou hast not formed the irrational animal after thy likeness ; it is man alone who can rejoice in thee ; man alone, can know thee, can be conscious of his existence, and aspire to live with thee eternally.

Let us celebrate the Lord ; he is nigh unto us : let all his hosts praise him ! The Lord is present every where, in heaven, on earth, and in the seas. I glorify thee ! I sing thy praise ; for, wherever I am, there thou art, ever near me by thy power, thy love, and thy bounty.

Thou commandest the clouds to extend themselves over the fields ; thou waterest the thirsty land, that man may be enriched by the gifts of thy hand. Thou commandest the hail, the winds, and the dew, (these messengers of thy power,) to become sources of happiness to mankind.

Even, when the tempest arises ; when the thunder rolls, and strikes men pale ; then fertility and blessedness spring from the bosom of the stormy darkness, speedily the sun restores us his light, and songs of joy succeed peals of thunder.

It is in Thee alone that we find happiness : in thee alone, the Author of all good. It is thou who enablest us to draw salvation from the eternal springs. Happy here below, happy the mortal who submits to thy government ; and is prepared to leave this world with joy, in hopes of being united to thee, his Creator and Father, by his Redeemer, the Lord Jesus Christ !

APRIL I.*

ABUSE OF ANIMALS.

MEN abuse animals in so many different ways, that it would be difficult to enumerate them. These abuses, however, may be confined to two principal classes. They are generally *too much*, or *too little* valued : and in either case we act contrary to the designs of the Creator. On one hand we value them *too little*, when, under the pretence that God has given us the use of them, we exercise an unlimited power over them, and treat them according to our caprice. But how can we prove that we have this right ? And supposing we have it ; is it just that our empire over them should degenerate into cruelty and tyranny ? Every man who is not wholly corrupted by

evil affections and vicious habits, is naturally inclined to compassion for every being endued with life and feeling.

This disposition undoubtedly does us honour : and it is so deeply engraven in the soul, that the man who has got it effaced shows how much he is degraded, and how far he is fallen from the dignity of human nature. He has but one step more to take, i. e. to refuse that compassion to men which he denies to brutes ; and then he becomes a finished monster. Experience but too well justifies what is said here, and every reader will be able to recollect examples of this ferocity :—history furnishes us with them in abundance. People who divert themselves with the combats of animals, distinguish themselves also by their cruelty towards their fellow-creatures. So true it is, that our conduct towards the brute creation has a great influence over our moral character, and the gentleness of our manners. But it may be said, we have a right to kill noxious animals. Granted ; but does it follow that we have a right to tear from them, without pity or remorse, a life which is naturally so dear to them ? And when necessity obliges us to deprive some of them of their lives, have we a right to cause them to suffer a thousand torments, often more cruel than death itself ? And how far are we from every principle of humanity, when we can make it our diversion, and find a barbarous pleasure in it ? I grant also, that the Creator has given us animals for our use and pleasure ; and that they are destined to alleviate our labours by their own : but does it follow that we have a right to exhaust them by labour, without the least necessity ; cause them to labour beyond their strength : refuse them that subsistence which their services merit ; or increase their sufferings by rigorous treatment ? But no more need be said on this first kind of abuse.

People sometimes fall into another extreme, and rate some animals beyond their value : those which are of a social disposition, which have most connexion with us, which live in our houses, which are useful to, or amuse us, often inspire us with a ridiculous and extravagant affection. I am ashamed to say, that there are both men and women absurd enough to love these creatures to such a degree, as to sacrifice to *them*, without hesitation, those essential duties which they owe to their fellow-creatures. Let war light its fire-brand between nations ; let whole armies destroy each other ; the news makes no impression on that lady, who, a few days after, is inconsolable for the loss of her *lapdog* ! Much might be said on this ridiculous business ; but I shall pass it by, and conclude this meditation with an important remark. Parents and teachers cannot be too attentive to abstain scrupulously from every abuse of animals in the presence of children. It is the more necessary to insist on this, as the practice of it is so much neglected, and children have such bad examples set before them as often have the most baleful influence over their passions and conduct.

No animal should ever be put to death in the presence of children : much less should *they* ever be commissioned to do it. Let them be

accustomed to treat animals as beings which have life and feeling ; and towards which God has given them important duties to fulfil. On the other hand, let proper care be taken that children do not attach themselves too much to animals ; nor be passionately fond of them, to which folly they are naturally inclined. While we take care that our children do not abuse animals in any way ; we should also show them the proper method of using them : that they may, from their tenderest infancy, be led to acknowledge, even in these creatures, the impress of the Divine Perfections.

APRIL II.

THE MOTION OF THE EARTH.

WHEN the delightful spectacle of the rising sun renews, each morning, in our souls, that gratitude and admiration due to the sublime Author of the universe ; we may at the same time observe, that the *place* of this magnificent sight changes with the seasons. To be convinced of this, we have only to mark the place where the sun rises in spring and autumn ; and we shall perceive it afterward in summer more to the north, and in winter more to the south. We then reasonably conclude, that some motion must be the cause of this change ; for we cannot see any body whatever which changes its place, without a motion taking place either in itself, or in us who observe it. People are naturally led to suppose, that it is the *sun* which moves ; and that it is because of this, that we see it sometimes on one side, sometimes on the other. But as the same appearances must take place, supposing the sun to remain immoveable, and that we with the earth turned round him, and that we neither perceived the motion of the earth, nor that of the sun, we ought to depend less on our own conjectures, than on the numerous observations which astronomers have made in the heavens ; and which sufficiently prove that the earth alone turns round.

In the first place, let us consider that immense space in which the heavenly bodies are fixed ; a place which is either empty, or filled with an infinitely subtile matter, which is called *Ether*. It is in this that our globe, and all the other planets which compose the solar system, swim. The sun, concerning whose magnitude we have already spoken, is placed in the centre, encompassed with his subjects, the planets, whom in size he vastly surpasses. That principle of gravity, which our globe possesses in common with all other bodies, directs it towards the centre ; or rather, the sun attracts the earth by that power which large bodies have to attract those that are less : so that as often as the earth tends to move off in a straight line from the sun, the attractive influence of the sun constantly draws it towards itself ; by this means, the earth is caused to revolve in a circle round the sun, in the same manner as a sling turns round ; or, to make use of a more

The motion of the earth.

analogous example, as a cannon-ball, which at first describes a curve line : it is true, that it will again fall back to the earth, after having gone through a certain distance ; but it would continue the same line for some miles farther, were it projected from the top of a high mountain : suppose a greater elevation, and it will go farther in proportion : add to this height, and it will go as far as our antipodes, in order to return to the point whence it set out.

All these effects take place from the laws of gravitation, or the attractive power of our globe : and it is in this manner that our earth revolves round the sun. The orbit it describes is not a perfect circle ; but an ellipsis, in one focus of which the sun is placed ; which is the reason that we are farther from the sun at one time than we are at another. This orbit is 44,000 semidiameters of our earth. To make this revolution round the sun, the earth takes 365 days, 5 hours, 48 minutes, and 43 seconds ; which is the space of time that completes our *year* : and at the expiration of which, we find the sun in the same part of the firmament. For in every part of the earth's orbit, we find the sun in the opposite part of the heavens ; so that while the earth insensibly continues its motion, we imagine it is the sun which moves. In spring, the sun is equally distant from the two poles : whence the equality of day and night. In summer it is 23 degrees, 30 minutes, nearer the north, which is the cause of our longest days. In autumn it comes again to an equal distance between the two poles ; and in winter it goes as far to the south, as it was in summer to the north ; which occasions our shortest days.

If such be the order and arrangement of the great works of the creation ; it is an additional cause to admire and adore the supreme wisdom and goodness of the Creator of the universe ! How precious should every increase of knowledge be, which makes a further discovery to us of the Author of nature, in the works of his own hands ! Every where we find HIM ; and every where we are constrained to cry out, Lord, thou hast formed all things with admirable wisdom !—And shall we not, in the fullest assurance, and in the utmost confidence, commit the government of our lives to Him who governs the world with so much wisdom ? The sun and planets obey his laws, without ever varying ; and shall we oppose his will, or violate his precepts ? When we undertake a voyage, in which dangers multiply at each step, we have need to take refuge in his paternal care. And how much more need have we of his powerful protection, in this course of so many thousand leagues, which the annual revolution of the earth causes us to pass through ! Is not this a new blessing from God ; (a blessing but little thought of by the generality of men) to have been preserved hitherto in so formidable a voyage ? Shall less important phenomena and trifling dangers shake our courage, after such daily proofs of the protection of the Most High in the most important revolutions of nature ? Henceforth let us banish any distrust, and surmount every fear by faith in the Almighty Creator of the heaven and the earth,

The motion of the earth.

and let us look for the *right* to call him our *Father*, by being reconciled to him through Christ Jesus.

APRIL III.

THE ABUNDANT RICHES OF NATURE.

TO be fully convinced of the extreme liberality of nature in the dispensation of her gifts, it would, in my judgment, be sufficient to reflect on that prodigious number of human beings who receive their food, raiment, and all the pleasures they enjoy, from this beneficent parent. But as this is one of those things which, because they frequently happen, are little regarded; we will turn our meditations on certain creatures, which, though partly made for our use, are nevertheless many of them objects of our contempt. This meditation may teach us, that all the beings scattered over our globe proclaim the goodness of their Author, and may engage us to glorify his holy name, if our heart be susceptible of any good impression.

Innumerable multitudes of living creatures, which inhabit the earth, the air, and the waters, are daily debtors to nature for their subsistence. The animals which we take so much care to feed, owe properly their nourishment to her. The grass that grows without our sowing, is their principal aliment. All the genera of fish subsist without the aid of man, unless, for his pleasure, he choose to feed some particular sorts. The forests also produce acorns, the meads and mountains produce grass; and the fields different kinds of small seeds, without any cultivation. Among birds, the most numerous, and perhaps the most despised species, is that of the *sparrows*. Their number is so prodigious, that it has been supposed, that the produce of every field in the whole empire of France, could not support them for the space of one year. It is nature who takes from her immense magazine what is necessary for their support, and they are the smallest part of her dependants. The number of *insects* is so great, that probably several centuries may elapse before all their different kinds shall be ascertained. How numerous are the *flies*! and how many different kinds of those little animals, whose stings we feel, and which we see sporting in the air! The blood which they steal from us is but an accidental food to them: and we may readily imagine, that for one which has fed on this, there are millions which have never tasted either human blood, or that of any other animal. On what do all these creatures live? There is not a handful of earth that does not contain living creatures; and in it they are nourished by one means or another. In every drop of water, we discover creatures, the means of whose nourishment, and their multiplication, are incomprehensible to us.

Immensely rich as nature is in living creatures, she is equally fruitful in means for their subsistence: or rather, it is the Creator

The abundant riches of nature.

who has caused that inexhaustible source of riches to spring from her bosom. Through him, every creature finds its habitation and nourishment. For them he has caused the grass of the field to grow ; directing each to choose that sort of food which is best suited to its nature ; and none of them is so mean in his sight as to induce him to withhold from it his tender regards and bountiful support. In this, O Almighty God, is thy grandeur manifested ! What no man, no monarch, nor all the men and monarchs of the world could do ; thou, the Creator, dost perform. Thou satisfiest the desire of every living thing.—Thou feedest the young ravens, and nourishest all the insects which inhabit the air, the earth, and the water !

And will he not do for thee what he does for them, O thou of little faith ? Should a doubt or fear, concerning thy support, ever arise in thy soul, consider the creatures which God daily feeds. Let the fowls of the air, the wild beasts of the deserts, and the millions of creatures which man takes no care of, teach thee the art of living contentedly. “ He who adorns the flowers, who gives pasture to the cattle, and food to all creatures ; this great Author of nature knows all thy wants ; apply to of him in all thy afflictions : and let thy prayers be accompanied with aith and confidence.”

APRIL IV.

THE RISING OF THE SUN.

HAVE you ever witnessed that superb spectacle which the rising sun every day affords ? Or, have effeminacy, and love of sleep, or a criminal indifference, prevented you from contemplating this miracle of nature ? Perhaps you may be reckoned among the number of those who have never supposed that a sight of the *dawn* was worth the sacrifice of a few hours of sleep ; or, you are like others, who, contented that the sun shines, never put themselves to any trouble to inquire into the cause of that effect. Or lastly, like thousands of your fellow-creatures, you perhaps daily see this grand spectacle, without being affected by it ; without forming any idea of its nature ; or reflecting on its excellence and use. It matters not to which of these classes you belong : suffer yourself now to be awakened out of this state of insensibility, and learn what thoughts a view of the rising sun should excite in your soul.

There is no phenomenon in nature more beautiful and splendid than the rising sun. The richest dress that human art can invent ; the most splendid decorations, the most pompous equipage, the most superb ornaments of regal palaces fade away to nothing, when compared to this beauty of nature. First, the eastern region of the sky, clothed in the purple of aurora, announces the approach of the sun. The sky by degrees is tinged with a rose colour, and by and by, flames like burnished gold. Then the rays of the sun transpierce it, and dif-

Rising of the sun

fuse light and heat over the whole horizon. Finally, the sun himself appears, in all the splendour of his majesty: he rises visibly higher and higher; and the earth appears in a new point of view. Every creature rejoices, and seems to receive new life. The birds hail this parent of day and author of light, with songs of gladness. All the animals are in motion; and feel themselves influenced with new strength and new spirits.

Raise thyself up to God, O my soul! Let *thy* songs of praise also ascend from the earth, and resound through that heaven which is the residence of Him, by whose orders the sun rises, and whose hand directs his diurnal and annual course, from which result the blessed revolution of day and night, and the regular succession of the seasons.

Raise thyself, O my soul, to the Father of lights, and celebrate his Majesty. Celebrate him, by a solemn acknowledgment of thy dependence upon him; and by actions which are pleasing in his sight! See all nature proclaims harmony and order. The sun and all the planets run their course; every season brings its own fruits, and every day renews the splendour of the sun. Wilt *thou*, in the midst of this active creation, be the only one that shall be found deficient in praise to thy Creator? No, let thy faith and virtue, let thy pious zeal, teach the infidel how great and how worthy of adoration that God is, whom *he* neglects or despises. Let thy peace of soul teach the vicious how kind and merciful that God is, before whom *he* trembles. Be to thy brethren what he is to thee: be to them what the sun is to the universe. As he daily sheds his benign influence upon the earth; as he shines upon the just and the unjust; as he illuminates the humble vallies, as well as the summit of the highest mountains; like him, let thy life be useful and beneficent, a blessing and consolation to mankind. Let the charitable disposition of thy heart be renewed daily; do good to all according to thy power, without respect of persons; in a word, endeavour to live and act so that thy life may become a general benefit to the world.

To-day thou hast seen the rising of the sun; and supposing thou art 30 years of age, it has already risen more than 10,000 times over thy head, and yet this is the *first* day thou hast made similar reflections to the above on this phenomenon! And, probably, this is the last day in which thou shalt see it rise in this lower world. Let this uncertainty render thee so much the more attentive to glorify thy great Creator; and contemplate the sun this day with such sentiments as may be prolonged through a blessed eternity.

APRIL V.

THE WONDERFUL CONSTRUCTION OF THE EAR.

ALTHOUGH the ear, in point of beauty, must give place to the eye; it is, nevertheless, perfectly adapted to its use, and no less a masterpiece of the Creator's hand. In the first place, its position

 Wonderful construction of the ear.

shows much wisdom : it is placed in the most convenient part of the human machine, near the brain, the common seat of all the senses. The external structure of the ear deserves our admiration ; it nearly resembles a muscle ; but it has neither the softness of mere flesh, nor the hardness of bone. Were it flesh only, the upper part would fall down over the orifice, and prevent the communication of sounds. If, on the other hand, it were provided with solid bones, we should feel much pain and many inconveniencies, when we lay on either side. On this account, the Creator has chosen a cartilaginous substance for the outward part of the ear ; which has that degree of firmness, that polish and folding, which are most proper to reflect sounds ; for the whole use of the external part is to collect the undulations of the air, and convey them into the orifice of the ear.

The *internal* structure of this organ is still more proper to excite our surprise. Within the ear there is an opening which is called the *meatus auditorus*, or *auditory canal* : the entrance, which is defended with small hairs, to prevent insects from penetrating into it ; and it is for the same purpose that it is always moistened with a sort of bitter glutinous humour, called the *ear-wax*, which is separated from its glands.

The *tympanum*, or *drum*, is placed obliquely in the auditory canal. This part of the ear has really a great resemblance to a drum ; for, first, there is a sort of bony ring in the cavity of the auditory canal, over which a round, thin, dry membrane is stretched. Secondly, there is a muscle tightly connected with the *malleus*, which answers the same end here, that the catgut string does to the drum : it increases the vibration of the membrane, and serves sometimes to tighten, and sometimes to relax it. In the cavity under the drum, there are some very small, but very remarkable bones called *auditory bones* : they are distinguished by these names ; *malleus*, the *hammer*, *incus*, the *anvil*, *os orbiculare*, the *orbicular bone* ; and the *stapes*, or *stirrup*. Their use is to contribute to the vibrations and extension of the tympanum. Behind the cavity of the drum, there is another opening called the *eustachian tube*, which leads to the palate. This passage lets the air in and out from the funnel of the ear, to make the membrane vibrate the better. Sounds received through the mouth, are heard by means of this passage, when the outward orifice of the ear is closed up. Next come the *cochlea*, which rises in a spiral line, similar to a winding staircase : and finally, behind this, the *auditory nerve* terminates in the brain. Therefore, the essential requisite of hearing consists in the aforesaid *tympanum*, or *drum*, and the *auditory nerve* : the external parts serving only to collect the sound, or undulations of the air, in order to strengthen the sense of hearing.

Hearing is a thing in itself highly worthy of admiration. By a portion of air extremely small which we put in motion, we know not how we can, in an instant, make our thoughts, desires, and conceptions known to another ; and that as perfectly as if his soul could see into

 Wonderful construction of the ear.

ours. But to make the action of the air in the propagation of sounds more easy to be understood, let us remember, that the air is not a solid, but a fluid body. Throw a stone into calm water, and it will occasion undulations, which will extend more or less, according to the degree of force with which the stone was cast in. Let us now suppose that a word spoken produces the same effect in the air which the stone does in the water. While the speaker pronounces the word, he expels, with more or less force, a quantity of air out of his mouth: this air communicates an undulatory motion to the external air; and this air, thus put in motion, communicates its vibrations to the *tympanum*, or drum; by the drum, the air contained in the cavity of the ear is agitated; by these agitations, the *hammer* is shaken; the hammer in its turn, shakes the *anvil*, and the *os orbiculare*; and the *stirrup* transmits to the nerves, through the *fenestra ovalis*, or oval orifice, the motion it has received, and those vibrate like the strings of a harpsichord. This motion of the air gains strength by agitating the fluid contained in the labyrinth and cochlea: and communicates itself to what is properly called the *auditory nerve*. The soul then feels a sensation proportioned to the strength or weakness of the impression received; and by virtue of a mysterious law of the Creator, forms to itself representations of objects and of truths.

What joy should we feel in being capable of distinguishing sounds! How deplorable would our case be, were we denied the faculty of hearing! in certain respects, privation of hearing would be worse than the loss of sight. Through the eye, only sensible and corporeal ideas can enter into the soul: but by the ear, we may form ideas of invisible and spiritual subjects. Consequently, had we been born deaf, it would have been extremely difficult for us to have received any instructions concerning religion, God, the nature of the soul, or salvation. We could not have acquired knowledge sufficient for any art or science whatever. In order to make his goodness still more manifest to different generations of men, God permits now and then a person to be born deaf. Let us never look on any of those helpless persons, without endeavouring to estimate better the worth of the sense of which they are deprived, and that goodness of God which has granted it to us. And let us ever remember, that to make a proper use of our hearing, is the best method of testifying our gratitude to God for so great a gift.

 APRIL VI.

THE GALAXY, OR MILKY WAY.

WHEN we examine the sky in a clear night, we discover a pale, irregular light, and a vast number of stars, the confounded rays of which compose that light. This apparent luminous cloud, or tract, forms what we term the *Milky Way*.

Galaxy, or Milky Way.

These stars are at too great a distance to be perceived separately by the naked eye ; and what is more, among those which are visible through a telescope, there are spaces filled with an immense number of others, which even a good telescope cannot distinctly perceive. It is true that the number of those already discovered is prodigious ; but if we could make observations on the other side of our globe near to the antarctic pole, we should make new discoveries, and see a greater number of stars than have yet appeared on our hemisphere. And even then we should not be able to discover the half, no, nor the thousandth part of those radiant bodies which burn in the immense extent of the firmament of heaven.

All the stars which we see in the Milky Way, appear only to be luminous points ; although the least of them is much larger than the whole terraqueous globe. When we view them with instruments of the greatest magnifying power they appear just as small as they do to the naked eye. Could an inhabitant of our globe ascend 160 millions of miles, the fixed stars would still appear to him only as luminous points. How incredible soever this may appear, yet it is not a chimerical idea, but a fact which is annually proved ; for, about the tenth of December we are more than 162 millions of miles nearer to the northern part of the heavens, than we are on the tenth of June. And notwithstanding this, we never perceive the stars to have any increase of magnitude !

This Milky Way, which is but little in comparison of the rest of the heavens, is sufficient to attest the magnificence of the Supreme Being : and each of the stars which we see in it, tells us of the wisdom and goodness of our God. And what are these stars in comparison of that immense number of globes and worlds which roll in the bosom of the firmament ! Here reason itself is confounded : to wonder and adore is all that is left to mortals.

As often as we behold the starry sky, may we lift up our souls to thee, O adorable Creator ! How seldom, (with shame and regret we may confess it) how seldom have we thought of thee, when we viewed the firmament ! How little have we admired thy grandeur, or praised thy might ! Pardon this insensibility—this ingratitude ! Loose these souls, bound by earthly ties—loose them, and raise them to thyself, O Creator of heaven and earth ! Grant that a deep sense of our littleness may humble us at thy feet : then raise us by that sublime hope, that our ransomed souls shall one day soar far above the region of the fixed stars ! Amen.

APRIL VII.

REFLECTIONS ON THE SEEDS OF PLANTS.

TO an attentive observer of the works of God, the vegetable kingdom is a school to teach the profound wisdom and unlimited power of this Supreme Being. Though we should live a hundred years on

Reflections on the seeds of plants.

earth, and though every day should be consecrated to the study of one particular plant ; there would still remain, at the end of those years, a number of things which we had not observed, or which we were not capable of perceiving. Let us reflect on the production of plants ; let us examine their internal structure, and the formation of their different parts ; let us consider the simplicity and diversity discoverable in them, from the smallest blade of grass to the most exalted oak. Let us endeavour to understand the manner in which they grow, propagate, and are preserved ; and the different uses they are of, to men and animals. Each of these articles will be sufficient to occupy all the strength of our understanding ; and cause us to feel the infinite power, wisdom, and goodness of the Creator. We may every where discover, with admiration, the most astonishing and incomprehensible order, and the most excellent designs.

Though we should know more of plants than the phenomena which every eye may observe : though we were only to know, that one grain of wheat, when it is sown in the earth, first shoots a root down into the ground, then shoots a stem upwards, and bears branches, leaves, and fruit, in which are included the germs of new plants : although, I say, we could know only *this*, it would be sufficient to discover the profound wisdom of the Creator. Let us attentively consider all the changes which a grain of wheat undergoes in the earth : we sow it at a fixed time ; this is all we can do. But what does nature, or rather God, when we have thus left seed in the ground ? As soon as the earth has furnished it with the requisite moisture, it swells : the external skin which hid the root, the stem, and the leaves, rends ; the root penetrates into the earth, and prepares sufficient nourishment for the stem, which then endeavours to sprout above ground. After it has sprung up, it increases gradually till it has attained its proper height ; then it unfolds its leaves, which are white at first, then yellow, and afterwards tinged with a beautiful green. If we confine ourselves to examine only this grain of wheat, so necessary to our subsistence, what a miracle of wisdom shall we discover in it ! As soon as the covering which enclosed the germ is rent, and the root which is to support the grain, has penetrated the earth ; the stem ventures to shoot up in the form of a fine and delicate thread ; and however weak it may appear, it is nevertheless sufficiently fortified against the intemperature of the air. By degrees, it grows up and becomes an ear of corn, the sight of which is pleasing to man. The grain is enclosed in leaves, which serve as a sheath till it is strong enough to break through them, and it is generally armed with points to defend it from the birds.

The fields on which corn is sown, should put us in mind of those fields where God sows another sort of seed. Human bodies laid in the grave, are also a seed which is to grow up and ripen for eternity. In considering a grain of wheat, we have as little reason to expect that it will produce an ear (though the essential parts of it are included in the grain) as we have to believe that our bodies, reduced to

dust, shall become glorious bodies, though the essential matter of this glorified body is probably included in this earthly one. But, let us wait patiently, and this harvest will also come.

“The time will come when the seed shall unfold itself, our dust shall arise, and we, if saved from our sins, shall live the life of Jesus. Ye, who condemn this faith, how shall ye appear in that great day? Our bodies, it is true, shall rot, and be turned to dust; but we shall not continue for ever in that state to which death has reduced us. Our souls, saved from sin, shall rest from the labours of this life in the bosom of our God, filled with happiness and adoration. Eye hath not seen, nor ear heard, neither hath it entered into the heart of man to conceive a state of salvation so glorious as this!”

APRIL VIII.

THE AZURE COLOUR OF THE SKY.

TO judge merely by our senses, we might suppose that the great vault above our heads was painted blue, and that the stars were so many brilliant nails stuck in it. It is true, that such an idea as this can only be found among children, and the lowest of the people. Yet, there are many who think themselves superior in capacity to the vulgar, who, notwithstanding, form very absurd notions of the sky. Perhaps the reader may ask, Why does the sky appear blue in the day time? The reason is this: our atmosphere is not quite transparent; could we elevate ourselves to a great height above the earth, we should find that the air became more rare in proportion to our ascent, till respiration became impossible, and the atmosphere ended in pure ether.

The higher we climb on mountains the lighter the air grows, and the paler the bright azure of the sky appears: and could we rise above the atmosphere the blue appearance would totally cease: the sky would appear as black as it does during the night; for all objects which do not transmit rays of light to us, appear so: consequently, if the air which surrounds us were of a matter as transparent as ether, the sky could not appear blue. Our atmosphere is filled with a multitude of small particles, which, when illuminated by the sun, receive a motion, by virtue of which new rays are produced, and these particles, obscure in themselves, become visible to us when thus illuminated. They are of a blue colour: hence a forest which appears green, when we are nigh to it, becomes more and more bluish in proportion as we recede from it. However pale and fine the blue rays of air may be, such a vast number of them fall upon the eye at once, when we are in the open air, that the effect resulting from them is a dark blue.

What has been said, may lead some to consider the heavens differently to what they have done: and from this also we may conclude,

Azure colour of the sky.

that there is not a phenomenon in nature, not even the colour of the sky, in which we may not discover great contrivance, order, and utility. As *green* is the most pleasing colour for the general ornamenting of the earth, so the beautiful *azure* which adorns the heavens, is best calculated to please the eye. How formidable is the aspect of the sky when it appears covered with clouds and storms! But what majesty, what beauty, what simplicity, in the colour of the sky, when the weather is fair! The apartments of kings, decorated with the pencil of the most eminent painter, are nothing in comparison with the majestic simplicity of the celestial arch. When the eye has for a long time contemplated terrestrial beauties, it gets tired: but the more we behold the celestial azure, the more charms and beauty we discover in it.

But who has clothed the sky with that colour, which has so richly adorned it? It is thou alone, O Almighty Creator! On thee may I meditate, and to thee may I render due praise, as often as my eyes behold the celestial azure.

APRIL IX.

THE UTILITY AND NECESSITY OF THE AIR.

AIR is the element to which this lower world owes its life, beauty, and preservation. All the changes which we see take place in different beings here below depend upon the air. It is absolutely necessary to the existence of animals; for the greater part of them could not live more than half a minute, if they were deprived of it: and the others could not bear the want of it more than two days at the most. Not only terrestrial animals, and those which inhabit the air, cannot live without this element; but it is also indispensably necessary to the inhabitants of the waters, who need fresh air as well as other animals. Birds cannot fly, but as they are supported by the air: hence their lungs have openings, through which the air passes into the whole cavity of the belly. This circumstance alone discovers to us His profound wisdom who has formed them: for the body of the bird being filled, and puffed out by the air, becomes lighter, and is better adapted to flight.

Even plants, in order to vegetate, have need of air; hence it is that they are full of a multitude of little vessels which serve to take it in; and by means of which the smallest particles are saturated with the necessary juices. Nothing would be easier than to multiply proofs of the necessity of the air: let us mention one circumstance only, which will clearly demonstrate this necessity. If the air did not exist, there would be no twilight before the rising of the sun. It would arise suddenly above the horizon, and would appear as bright as it is at noon-day: nor would its appearance be in the smallest measure changed, till

 The utility and necessity of the air.

the instant in which it disappeared ; and from that moment we should be in the thickest darkness. The sun, indeed, would strike our eyes with a vivid light, if there were no air ; but it would appear during the night, like a great fire burning in an open country. It would, in some sense, be day as long as the sun, and the objects which immediately surround us, should be visible : but all the rays which fell on bodies placed at a certain distance, would be reflected in a right line, and be lost in the infinite extent of the heavens. Thus, though the sun were placed directly over our heads, we should nevertheless experience a species of night, if the atmosphere were not placed between us and that luminary.

Let us recapitulate all the advantages which the air produces to our globe. It preserves life, as it is the principle of respiration to living creatures. Through it, winged animals fly ; and by its assistance, fish swim. Sounds are propagated by it, and it holds the earth in equilibrio with other globes. Without it, neither vapours, rains, nor winds could be formed. But, it is also necessary to fertilize the earth ; to promote the vegetation of plants ; and to disperse, by its agitations, the malignant vapours which exhale from different bodies. The sun itself could not furnish us with either a sufficiency of light or heat, if the air did not surround our globe. No person could be heard, if the air did not set the organs of speech in play, if it did not transmit sounds, and act on the organs of hearing. How innumerable, then, in every respect, are the advantages which the air produces to the human race !

If we should accustom ourselves to contemplate this grand spectacle of the creation with an attentive mind : we should be naturally led, were there no other motives, to exalt the works and the benefits of our God. The reason why we have hitherto neglected this duty is, we have taken but a superficial view of his works : and while we enjoyed his blessings, our hearts have not deeply felt their own unworthiness. Let me entreat the reader, for his own peace and happiness, to endeavour, by the aid of divine grace, to become an attentive and sensible spectator of the works of God ; for, to those who consider them, they are a source of pure and permanent joy.

 APRIL X.

DIFFERENT SOILS.

THE soil is not the same in all places. The upper bed is commonly formed of black, friable, and rich earth, which being mixed with the remains of plants and animal substances, becomes the nourishing parent of the many thousands of vegetables which enrich our globe. But even this bed varies in quality : in some places it is light and sandy : in others it is clayey and heavy : sometimes it is moist, at other times dry ; here warm, there cold. Hence it is, that plants and

Different soils.

herbs, which grow naturally in some countries, do not succeed in others, without art and cultivation : and this diversity of soils is also the cause why vegetables of the same species differ among themselves, in various respects, according to the nature of the soil on which they grow.

In this also the wisdom of the Creator may be clearly seen : if all soils were alike, if all were of the same quality, and had the same constituent parts ; we should be deprived of many thousands of vegetables, as each species of plant requires a soil analogous to its nature. Some plants require a dry, others a wet soil : some require warmth, others delight in cold ; some grow best in the shade, others in the sun. Some spring on the mountains, and many more in the vallies. Hence it is, that each country has a certain number of plants, which are peculiar to it ; and do not succeed perfectly in others. Let the *alder* be transplanted into a sandy soil, and the *willow* into one that is rich and dry, and it will be found that these soils are not suitable to the nature of these trees ; and that it will answer better to plant the first near marshes, and the second by the sides of rivers. Thus the Creator has provided for every class and species, by assigning them that soil which is most analogous to their internal constitution. It is true, that art succeeds sometimes in forcing nature to produce according to our wishes : but it seldom happens that the effects of this restraint repay the trouble and expense : and in the end it is found that nature has great advantages over all the researches and operations of art.

The same variety which is found in the soil of our globe, appears also in the characters of mankind. There are some whose hearts are so insensible that they cannot profit by instruction : no motive influences, no truth, however self-evident, awakes them from their stupidity. This character may be compared to that stony soil, which no temperature of the air, no culture, however assiduous, can render fertile. A character almost as worthless, is that where levity predominates. People of this class also receive the salutary impressions of religion and piety ; but if the least obstacle occurs, they are discouraged, and their zeal vanishes as quickly as their good resolutions. Such are those frivolous, timid, and cowardly people, in whose minds truth and piety can take no root, because there is no depth. They resemble those light and dry soils where nothing comes to maturity ; where every thing is dried up by the scorching heat of the sun, because the soil does not furnish the plants with the necessary nutritious juices. But, how happy are those in whom, as in a good soil, the seeds of piety spring up, ripen, and produce an abundant harvest of good fruit !

On these different dispositions found among men, depends, less or more, the effect which the sacred word produces in their hearts. In vain does the sower sow the best seed ; if the soil which receives it have not corresponding qualities, all his toils are useless : the purity and goodness of the seed can never supply the natural defects of the soil. For, while it is so hard and compact that the seed cannot

penetrate it: or so sandy that it cannot take root; or so full of stones that the seed is choked; it is impossible that it should bring forth good fruit.

To which of these classes do I belong? Probably, my heart has not that degree of hardness which resists all impressions: but does it not resemble those light soils which here and there produce a stalk of corn, all of which are soon found to wither. Good thoughts, and holy resolutions, have often filled my heart: but, how short has their duration been! Alas! I plainly see that this heart must be changed before the seeds of faith and piety can bring forth good fruit; and before I can come to the enjoyment of blessedness. But, to effect this change is beyond the compass of my power: it is the work of the Divine Spirit. "O Lord, come to my help; make me like the fruitful soil; that, being faithful to my vocation, I may bring forth abundance of fruit: that I may be rich in good works, preserving the gift of thy grace in an honest and good heart."

APRIL XI.

THE NECESSITY OF REST BY NIGHT.

LABOUR is undoubtedly necessary to man: every one, according to his state and condition should apply himself to it: and it is certain that a great part of the happiness and convenience of life depends on it. But, we must grant that the strength of human nature would be speedily exhausted, and man become in every respect incapable of using the members of his body, and the faculties of his mind, if God did not continually supply him with such strength and activity as are necessary to fulfil the duties of his vocation. As we daily lose a portion of our nutritious juices, we should be speedily exhausted, and fall into a mortal decay by too great an exertion of strength, were not our animal spirits incessantly renewed. That we may be able to labour, it is necessary that a matter inconceivably thin and active should be separated from the blood, which is termed the *nervous fluid*. This fluid puts the springs of the brain-muscles in play, and supports the action and motion of our bodies. But the continual dissipation which is made of this matter would soon destroy it; and man would fall into languor, if these losses could not be continually repaired. The aliments could neither be digested, nor distributed regularly through the body, if we were constantly employed in labour. It is therefore necessary, that the operations both of the head, hands, and feet, should be at times suspended, to the end that the heat and animal spirits which were dispersed through the external parts, should be employed to assist the functions of the stomach, during the repose of the other parts of the body. Sleep renders us this important service. Towards the close of the day, the strength which had been in exercise from the morning, diminishes; the vital spirits are weak-

Necessity of rest by night.

ened ; the senses grow dull, and we are allured to sleep, without being able to resist. As soon as we give way to it we are refreshed and strengthened. The meditations of the brain and the labours of the body cease at once ; and the fatigued limbs acquire new strength. This reparation is as necessary to the body as to the mind. It renders our limbs more pliant and active, and preserves all the motions of the body in their due order ; it reanimates our intellectual faculties, and diffuses fresh activity and serenity through our souls.

How culpable are those who, through frivolous prettexts, base interest, or to satisfy their passions, deprive themselves of proper time for sleep ? They not only disturb thereby the order of nature ; an order which has been established for their welfare, but they wantonly enervate the strength of their bodies, and bring themselves to an untimely death. Why should we be so foolish as to deprive ourselves of a blessing with which our heavenly Father equally furnishes the rich and the poor ; the ignorant and the learned ; the great and the small ? Why should we shorten our days, when a wise and gracious Providence has established sleep as a mean of preserving our life ? Why should we voluntarily deprive ourselves of that restoring rest which sleep procures us ? Alas ! nights may come in which, far from tasting its sweets, we may be tossed on a bed of anguish, counting the doleful and tedious hours. And, probably, we shall never know the worth of sleep till we shall wish for it in vain.

Each night there are doubtless more than 30,000 of my fellow-creatures who, through pain and sickness, are deprived of the blessings of rest. I return thee thanks, O my God, that I am not one of the number of these unhappy people ! Sleep has in general had its proper influence upon me, as few of my nights have been disturbed by watching ; and a few of my days spent in grief or disappointment. I bless thee for those days and nights which have passed away so agreeably. Continue, O Lord, to remember me for good ; and if the wish be not opposed to thy holy will, grant that my future days and nights may be spent, at least as comfortably, and more to thy glory, than those that are past !

APRIL XII.

THE MAGNITUDE OF OUR GLOBE.

IT is not so easy as we imagine to determine exactly the size of the earth. It is true, there is but one longitude ; but there are two latitudes, the north and the south. Both of these being at the equator ; the one extends northward, the other southward, as far as the arctic and antarctic poles. But no one as yet has been able to reach either pole. The mountains of ice in Greenland, and the Northern Sea, have always obstructed the passage to the north pole : and immense fields, mountains, and islands of ice have rendered the pas-

 Magnitude of our globe.

sage to the south pole impossible. Thanks, however, to the geometricians, we can at present know very nearly the size of our globe. According to the most exact calculations, the surface of the earth is 199,512,595 square miles. The seas and unknown parts of the earth, by a measurement of the best maps, contain 160,522,026 square miles. The inhabited parts contain about 38,990,569 square miles, in the following proportion :

Europe	4,456,065
Asia	10,768,823
Africa	9,654,807
America	14,110,874

Hence it appears, that scarcely one third of the globe is habitable.

It has been calculated, that there might be at least *three thousand millions* of men upon the earth at once : but in reality there are no more than about a *thousand and eighty millions* : of which there are,

In Asia	650 millions,
In Africa	150
In America	150
In Europe	130

If then, we suppose the earth to be inhabited by *one thousand millions* of men, or thereabouts ; and that 33 years make a generation ; it follows, that in the aforesaid space of time, a *thousand millions* of men die. Therefore the number of men who die on the earth amounts

Each year to	30,000,000
Each day to	86,400
Each hour to	3,600
Each minute to	60
Each second to	1

This calculation is very striking. If the mortality be so great each year, and even each day : is it not very possible that I myself may soon be one that shall increase the bills of mortality ? At least it is certain, that this consideration should lead me every hour to make the most serious reflections. At this very moment, one of my fellow-creatures has departed from this world : and before an hour has elapsed, more than 3000 souls shall have entered into eternity ! What a motive to induce us to think often and seriously upon death !

Prodigiously great as the earth may appear ; it dwindles almost into nothing, when compared with the other worlds which roll over my head. The earth is scarcely, when compared with the universe, what a grain of sand is when compared with the highest mountain. And what is the universe, when compared to the inexpressibly glorious and infinitely great Creator of the heavens and the earth ? The world and all its inhabitants are before HIM as a drop in the bucket, or as the smallest atom which sports in the sunbeams ! And what am I, among those thousands of millions of the inhabitants of the earth ! But what am I before THEE, thou incomprehensible, infinite, and eternal Being !

APRIL XIII.

GENERATION OF BIRDS.

IN this season of the year a revolution takes place in nature, which certainly merits our whole attention. This is the time in which birds lay their eggs, and hatch their young. This miracle, which is renewed every year, though little regarded, is in fact what cannot be too much admired, as the following reflections will demonstrate.

In each impregnated egg, which has not yet been sat on, a small spot is seen on the yolk (about the size of a freckle) usually called the *cicatrice*. In the centre of this *cicatrice* there is a white circle, similar to a little partition extending a little upward, where it appears to unite with certain little bladders. In the middle of this circle there is a sort of fluid matter, in which the embryo of the chick swims. It is composed of two lines, or white threads, which sometimes appear separated from each other at the extremities, and between which a fluid substance is seen of a leaden colour. The extremity of the embryo is contained in a vesicle, or small bag, encompassed with a pretty large ligament, and in this the navel afterwards appears. The ligament is composed partly of a yellowish solid matter, and partly of a brown fluid, which is also encompassed with a white circle. This is all that can be observed in an impregnated egg before incubation. After the hen has sat on it about *twelve* hours, there appears in the lineaments of the embryo, which is in the centre of the little *cicatrice*, a humid matter, which has the form of a little head; on which vesicles are seen, which afterwards become the *vertebræ* of the back.

In *thirty* hours, the place of the navel appears covered with a multitude of little vessels, or bladders; then the eyes begin to be distinguishable. The two white threads, which, in uniting, have, however, left some space between them, enclose five vesicles, which are the matter of the brain and spinal marrow. The heart may then be seen: but whether the blood or heart be formed first, none has yet been able to ascertain. However this may be, we are sure that the embryo of the chick existed before incubation, in the impregnated egg: and after it has been some time sat on, the *vertebræ*, the brain, the spinal marrow, the wings, and a part of the muscles, may be distinguished, before the heart, blood, or vessels, can be perceived. At the end of *thirty-six* hours, the place of the navel is covered with a number of vessels, separated from each other by unequal spaces. In all likelihood, these existed before in the *cicatrice*; but only become visible now by the fluid which swells them. When the essential parts of the chick are thus developed, it continues to grow larger and larger, till in about twenty or twenty-one days, it is strong enough to break the shell in which it was enclosed.

We owe all these discoveries to certain great naturalists, who, by the assistance of the microscope, have followed, almost hour by hour,

 Generation of birds.

the progress of the formation and developement of the chick. But, notwithstanding all the information which we derive from their observations, there are many mysteries which probably will ever elude our researches. How does the embryo come into the egg? And how is it, that by means of heat, (for this is all the hen communicates) it acquires a new life and being? What is it that puts the essential parts of the chick in motion? And what is that vivifying spirit, which penetrates through the shell into the heart of the chick, and occasions its pulsations? Who has inspired the birds with an instinct to multiply by a way which is common to all? How do they know that their young is enclosed in the shell? Who disposes them to sit willingly on the nest all the time necessary to hatch them? These are questions which no man can answer in a satisfactory manner.

The little we do know concerning the generation of birds, is sufficient to show us the wisdom of the Creator; for the generation already noticed, cannot be attributed to blind chance, nor to art assisting nature. God had the wisest reasons for ordaining that certain animals should not arrive at their perfection till after they come from their mother's womb; while others continue in it till every part is formed. He who does not see the hand of God in the generation of birds, will not see it any where: for if the most profound wisdom be not manifest in this, it is discoverable in nothing.

O man! spectator of the wondrous works of God, adore, with me, the infinitely wise Being. Do not disdain to seek, in apparently mean objects, the impress of his ineffable goodness, power, and wisdom: especially, when it is for thy advantage, nourishment, and pleasure, that so many birds are perpetuated on the earth.

 APRIL XIV.

PROGNOSTICS OF THE WEATHER.

WINDS, heat, cold, rain, snow, fogs, drought, and other alterations in the temperature of the air, do not always depend on regular and fixed causes. There are, however, certain signs in nature which may enable us to guess pretty nearly what sort of weather is about to take place. The position of our globe in respect to the sun, which we observe in the four seasons of the year; the changes of the moon, which can be known to a moment; the influences which these heavenly bodies, and all the planets in our system, have on the heat, the cold, the motion, and the stillness of the air, are so many immutable laws, on which, prognostics concerning the weather, may be founded. The consequences drawn from these are the less to be despised, because they are founded on experience; and according to the rules of analogy we judge of the *future* by the *past*. It is true, that a thousand accidental circumstances may occasion alterations in the weather, which we had no reason to expect; but we should consider, that

these accidental circumstances are seldom of long duration; and if they bring about any change in the ordinary course of the weather, it is but for a short time, and in some particular places.

That, in general, the changes of the weather are according to such stated rules; and that they may be foreseen, is what our annual observations sufficiently prove. We are seldom mistaken in supposing that the north and east winds will bring cold, the south wind heat, and the west wind rain: and that during the N. W. wind, it rains in summer, and snows in winter. We may conjecture, with the same probability, that when the sky is red in the morning, there will be rain or wind in the course of the day: and that a red sky in the evening (when it is not of a copper colour) promises fair weather the day following. The weather we have in spring shows us what we shall have in summer. If, in spring we have much fog, it is a proof we shall have a wet summer. If there be great floods in spring, in the summer we shall have extraordinary heat and many insects. When there have been storms in spring, there is no reason to apprehend either hoar or night frosts.

But, supposing that it were utterly impossible to foretell the weather, we may, notwithstanding, be perfectly easy on that head. The variations of the weather, taken in the mass, are formed according to regular rules which God has established with much wisdom. And we may reckon, with certainty, that however unfavourable the weather may appear, it will, nevertheless, be advantageous to the earth, and contribute to its fertilization. In all the alterations which the temperature of the air undergoes, we may confide in that God who always proposes the most wise and beneficent ends in all his dispensations: without whose will there could be neither heat nor cold, rain nor drought, tempests nor calms: and who can turn to the good of the earth and its inhabitants even those phenomena which appear most injurious.

“All the ways of the Lord are marked with his goodness. And all his paths are loving kindness. Wisdom and benignity manifest themselves in all his dispensations; all that he does proclaims his glory, and invites us to praise and adore him. Let us for ever bless the name of the Lord; let all men exalt Him; and let all that breathe celebrate his praises from generation to generation!”

APRIL XV.

THE POSITION OF THE SUN.

GOD has assigned a situation to the sun which is perfectly suited to the nature of that luminary, and to the uses for which he has designed it. He has given it a determined bulk, and has fixed it in a space proportioned to the motions which it was appointed to execute. God has placed at a proper distance those planets on which the sun is to

Position of the sun.

act ; and this position, which has been assigned to him so many thousands of years ago, he has kept without ever departing from it : because, in fact, the least deviation would occasion the greatest disorders in the empire of nature. Certainly, nothing but unlimited power could work such a miracle. God alone could create this immense globe, fix it in a proper place, mark its limits, determine its motion, subject it to fixed rules, and support it invariably in the position and order which he has prescribed in the beginning. What wisdom and goodness beam forth in this arrangement, both in respect to the planetary system in general, and to the earth and all its inhabitants in particular !

The burning rays, which proceed from a globe of fire a million of times larger than the earth, must have an inconceivable activity, if, in falling, they continued united to each other : but, as they separate more and more, in proportion as they depart from their common centre, their power is diminished in proportion as they diverge.

Had our earth been placed in a point where these rays were too numerous or too near, it could not have borne the intense heat. Had it been thrown to the extremity of the solar system, it would have received only a faint light, and too little warmth to ripen its fruits and ordinary productions. The sun, therefore, is fixed in the very place in which it ought to be. He can now communicate to our world a sufficiency of light and heat ; penetrate and vivify the earth by his benign rays ; rarefy the atmosphere ; and produce all those effects, without which we could neither have dew nor rain, snow, hail, fogs, clear, or serene days. Placed as it is, it produces the regular vicissitudes of day and night, as well as the different seasons of the year ; and diversifies, in each of them, its action and influence.

It is not only to the sun, but also to the planets and fixed stars, and to all the bodies which appertain to our world, that God has allotted a place suitable to their nature, and agreeable to the ends for which he has created them. To me, who am nothing, in comparison of the sun, the Lord has condescended to appoint the place and state which, in every respect, are most suitable to me. May I fill up the duties of my place and condition with as much exactness and fidelity as the sun does his important functions, according to the invariable laws which were prescribed to him at the instant of his creation ! May I, in the place which I occupy, and in proportion to my powers, be as useful to the world, divide with my fellow-creatures the advantages I enjoy, communicate to the ignorant the knowledge I possess, comfort and strengthen the weak, and liberally distribute among the indigent the good things with which his providence has blest me !

APRIL XVI.

THE PERMANENCY OF CORPOREAL BEINGS.

NOTHING perishes in nature. From the beginning of the world to the present moment, not one grain of sand, not one atom, has been annihilated. The first forests produced by the powerful word of God, were adorned with an innumerable multitude of leaves : these fell off, withered, rotted, and ceased to be leaves. But the particles which composed them still remained : they were changed into dust, clay, or earth, but not annihilated. The matter out of which the first leaves and herbage have been formed subsists to this day, without having lost any of its essential parts. The plants which flourish at present, shall exist, as to their component parts, as long as the world shall endure. The wood which we burn, ceases, it is true, to be wood ; but its parts do not cease to exist. They are dispersed into ashes, soot, and smoke ; but none of them is annihilated. The empire of nature is liable to continual changes ; every thing is decomposed, every thing is regenerated ; but nothing finally perishes.

Let us not judge of these things by appearances. When revolutions and disorders happen in nature, we are apt to suppose that many beings are totally destroyed ; but this is an error : they are only differently modified, and become materials which enter into the composition of other beings. The water which is dissipated into vapour, does not perish : it decreases in one place, to increase in another. That which ignorant people consider as an entire destruction, is only, in reality, a simple change of parts. And the world, considered in the whole, is the same at present as it was the first day of the creation ; although a multitude of the parts which compose it, have undergone very considerable alterations.

Here we may think of our own bodies, and the change they will experience in the grave. It is true, they shall be entirely corrupted ; but annihilated they cannot be ; for the integral parts which compose them shall remain for ever. A proper conviction of this truth will be sufficient to fortify us against the fear of the grave and corruption ; and, at the same time, to confirm our souls in the hope of a resurrection.

“ Why then should my heart be troubled ? Why should it shudder at the thought of the grave ? That which goes down into the tomb, and is shut up there, is not I, but my earthly house. As to myself, I cannot be destroyed : every member is counted, and shall be preserved ; what I have been, I shall be for ever ; and shall endure world without end.”

The continual duration of corporeal beings may lead us to conclude, with much probability, that the soul also is immortal. Since none of our earthly parts can be annihilated, can we suppose that our souls shall be the only created things which shall perish ? No, the whole

 The permanency of corporeal beings.

corporeal world may sooner be annihilated than that one soul should perish which has been redeemed by Christ Jesus.

 APRIL XVII.

THE UTILITY OF RAIN.

IN the most proper sense of the word, rain deserves to be called *a gift from heaven*. The blessings which our heavenly Father pours upon us by this means are equally numerous and indispensable. As extensive as the desolation occasioned by a continual drought would be, so are the precious gifts which a refreshing and beneficent rain procures for us. It is impossible to describe, or conceive, all the advantages which accrue to us from rain. But, if we cannot exactly enumerate them, we may, at least, reflect on some of the most considerable.

The heat of the sun acts uninterruptedly on the different earthly bodies, and continually detaches subtile particles from them which fill the atmosphere in the form of vapour. With the air, we should respire those dangerous exhalations, were they not, from time to time, precipitated by rain; which bringing them down to the earth, thus purifies and refines the air. It is not less useful to us, in moderating the scorching heat of the atmosphere; and the reason of this is very evident: for the nearer the air is to the earth, the more it is warmed by the reflection of the rays; and the farther it is from us, the colder it is. The rain which falls from a high region brings a reviving coolness to those below, the pleasing effects of which we feel as soon as it has fallen.

It is also to rain that we must partly impute the origin of fountains, wells, lakes, brooks, and consequently rivers. Every person knows in what abundance we are supplied with these different waters in wet and rainy seasons: whereas they evaporate during a long drought. But, to be fully convinced how useful and necessary the rain is, we need only observe how the earth and its vegetables flourish after these fruitful showers, without which every thing would perish. The rain is, in various respects, the food of vegetables. It moistens and softens the earth, which otherwise would be parched, and in some sort, petrified by the heat of the sun. It conveys to, and circulates in the delicate veins and vessels of plants and trees, those nutritious juices which support their life, and increase their size. When it washes the mountains, it brings down a soft, friable, and rich mould, which it deposits in the vallies where it falls, and thus renders them fruitful.

O Lord! thou hast arranged all with wisdom; the earth is full of thy goodness. Such, doubtless, is the consequence which the reader should draw from this meditation. And, if by this he is excited to adore and praise God, it is to be hoped that the following reflections

The utility of rain.

on the same subject, will tend to impress this duty more deeply on his heart.

How beautiful a spectacle does a clear and serene sky present to our eyes! Is not that beautiful azure vault, which is stretched out over our heads, sufficient to fill every heart with admiration and joy? But all the beauties of the sky cease, as soon as, in obedience to the winds, the clouds come and draw a thick curtain before our eyes. With what reflections does such a change inspire us?—These are such as we should make. Whatever the beauties were which we contemplated with so much astonishment and delight, there are some more incomparably excellent of which no cloud can deprive us, and which alone can perfectly compensate us for the loss of all others. For, what are all the beauties of nature, in comparison with the beauties of this glorious Being; the contemplation of whom can alone constitute the felicity of an immortal spirit?

It is not without a wise design, that God deprives us, at certain times, of the things which please us the most. He designs that we should seek our happiness in himself; and ever consider him as our sovereign good.—Besides, are not these privations which we sometimes experience, compensated by several outward advantages? These clouds which hide from us the beauties of the sky, are the sources of those beneficent showers which fertilize the earth. Let us always remember, that though adversities may render our days gloomy and distressing; yet we may be persuaded that these afflictions shall be made, in the hands of our heavenly Father, instruments of our felicity.

Let us also consider rain as an emblem of the gifts of fortune. For, however beneficial moderate rains may be, they may be also as extensively injurious when they are of too long a duration, and when they come at improper times. It is the same with terrestrial goods; too great an abundance may be the cause of our destruction. Let us praise our heavenly Father that he has refused us those gifts which we should have found, in the end, to have been real punishments.

Finally, from what has been observed, let us learn to be contented with all the dispensations of that wise Providence which governs the world. God alone knows the proper method of distributing his own blessings. At his command the clouds come from afar to those places where they are to fulfil the will of their Creator. Shall man presume to direct their course, and to manage this one, and perhaps the most inconsiderable, part of the government of the universe? How then can we be rash enough to blame the ways of Providence in matters of much greater importance?

APRIL XVIII.

OF RESPIRATION.

RESPIRATION is the principal and most necessary of all the functions of animal life. Without this, it would be impossible to expel the saliva and excrements; and to cast off the superfluous humours by transpiration. Speech, and the several modulations of the voice, could not take place without respiration. It ministers to smelling: it serves to mix the chyle, the lymph, and the blood exactly together; and the latter it tinges with its red colour, and probably supports and renews the animal spirits, by mixing the air with the blood. It is a fact, that we could not exist an instant, if absolutely prevented from breathing.

But whence does this fountain of life proceed? How is it that we can respire! The *lungs* are the organs by which we inspire and expire the air. This viscus resembles a large purse, the top of which is fastened to a tube, by which the air penetrates into an infinity of vessels, trunks, and branches, which form the internal structure of the lungs. When the air rushes into the lungs the abdomen swells up, the ribs expand, and the lower part of the sternum or breast-bone comes forward. On the contrary, when we expel the air from the lungs, the abdomen is depressed, the ribs lower, and the sternum withdraws towards the back.

That all this operation may be performed in the most convenient manner, the Creator has, with the utmost wisdom, adjusted the internal parts of the body. More than *sixty* muscles are continually employed to procure respiration, by alternately dilating and contracting the cavity of the breast. Nothing can be more admirable than the construction of the *windpipe*. It is covered at top with a valve, which shuts it up closely in the moment of deglutition, which prevents the aliments from passing that way, and the breathing from being interrupted.—We do not discover fewer wonders in the lower part of this organ: in the branches of the windpipe, in the vessels of the lungs, in the distribution of the arteries and veins, which every where accompany the *bronchiæ* and vesicles, that the blood which they contain may every where receive the influence of the air.

It is very just that we should bless our Creator, who, having given us the faculty of respiration, has hitherto, by his goodness, preserved our breath. What emotions of gratitude and adoration should arise in our souls, when we consider that we respire 20 times in each minute, and consequently 300 times in a quarter of an hour! Thousands of accidents might interrupt and destroy this faculty of breathing. How many things, during our eating, drinking, or sleep, might enter into the windpipe, and put a period to our lives! If the Lord, by his providence, had not condescended to preserve our breath, and if he had not prevented the fatal consequences of our imprudence or negligence, we should have been long ere this deprived of life. Do we

 Of respiration.

feel that gratitude which these continual proofs of his goodness demand? Respiration is one of those favours which we every moment enjoy, without considering that it is to the great God we owe it. It would, however, be very just and right, that we should often reflect upon so great a benefit continually received; and were we habitually attentive to the particular and daily mercies we enjoy, we could, with more ecstasy and delight, contemplate the whole of the works and wonders of God, and be more sensibly affected by them.

Sovereign of my days! Master of my life and breath, do thou inspire my soul with those sentiments which I ought to possess! And give me not only the desire, but also the power, to celebrate thy infinite goodness!

 APRIL XIX.

PROOFS OF THE GOODNESS OF GOD, FROM THE WORKS OF CREATION.

THE most common and observable phenomena we see, either on the earth or in the air, manifestly relate to the service and benefit of the animal world. All that we see around us, above our heads, and under our feet, serves for our support and enjoyment.

What is more necessary for the preservation of our lives than food? With this the earth is every where covered. Herbs, pulse, and fruits, for the support both of man and beast, are dispersed over the whole surface of the earth, so that there is scarcely any place where animals may not find suitable nourishment. But God has not confined himself merely to make provision for our subsistence and necessities; he condescends also to furnish us with what may contribute to our convenience and comfort. Were the preservation of life alone necessary, water and common roots would be sufficient. But the Creator has furnished us with a great variety of aliments with the utmost liberality. He does not deal with us as a rigid economist, who gives to those who are dependant on him only enough to preserve them from famishing; but, like a generous host, he spares no cost to treat his friends well, and furnishes them with such a profusion as may minister not only to their support, but also to their comfort and satisfaction. Such is the munificence of God towards every living creature. There is scarcely a shrub, plant, herb, river, lake, or marsh on the earth, which does not serve for habitation and nourishment to some animals. In a tree, for instance, there are (besides the fruit,) leaves, bark, and wood: now each of these parts nourishes an innumerable multitude of living creatures. Caterpillars feed on the leaves: certain worms live on the bark, others live in the woody part. Thus, there is nothing in nature but what is useful to some animal. How great must the benevolence of God be, who never forgets any of the creatures which his hands have made: and who always condescends to watch over, and provide for their necessities!

 Proofs of the goodness of God.

What is more pleasing than the *light*? The wise man said, *Truly the light is sweet, and it is a pleasant thing to see the sun.* Now, his rays fill the whole extent of the heavens, and as long as the day lasts, the eye is surrounded with his light. It partakes of this universal benefit, and through this it enjoys a varied and transporting view of the creation. *Light* discovers to us all the riches of the works of God. Without it nature would be a desert to us; and its innumerable beauties would be for ever unknown.

How bountifully has God provided for the gratification of our senses! For instance, he has chosen the softest and most proper colours to please and refresh the sight. Experience proves that *blue* and *green* surfaces reflect those rays only which are least injurious to the eyes, and which they can contemplate the longest without being fatigued. Hence it is the Divine goodness has clothed the heavens with *blue*, and the earth with *green*; two colours which are the most pleasing and suitable to the organs of sight. They are vivid and pleasant enough to make agreeable impressions on the eye, and not too bright to injure it. They have also a variety of shades sufficient to distinguish the objects, and prevent too great an uniformity. Besides plants of various green shades, the earth presents us with the most beautiful flowers, which not only please the eye by thousands of different tints, but which also perfume the air, and regale our senses with the most delicious odours. The *ear* also is not unemployed: it is delighted with the songs of birds, which fill the air with their melodious concerts.

“With a heart full of gratitude and joy, I exalt thee, O my God, and celebrate thy goodness! O Lord, how great is thy kindness, and how tender and affectionate are thy parental regards! None of thy creatures is hidden from thy eyes; none of them is despised or neglected by thee. They are all, without exception, the objects of thy providence, and thou ever watchest over the whole. May thy beneficence be for ever the subject of my meditations, and may my soul incessantly praise thee, and rejoice at the remembrance of thy goodness!”

 APRIL XX.

BENEFICIAL INFLUENCE OF THE SUN'S HEAT.

AT the approach of spring, revolutions take place before our eyes, which should fill every attentive spectator with astonishment. Nature gradually resumes the life which she appears to have lost during the winter. The earth is clothed with verdure; the trees are covered with blossoms. New generations of insects and other animals, burst forth from all parts, which rejoice in their existence, and which are endowed with a thousand different instincts. Every thing is animated:—all nature revives: and this new life, which is

Beneficial influence of the sun's heat.

manifested in the noblest parts of nature, the animal and vegetable kingdoms, is produced by the return of that heat which awakens their productions, and puts their renewed strength into motion. It is to the sun; we owe this admirable revolution. He is the source of life, sensation and joy; for his salutary and vivifying rays are diffused through all the kingdoms of nature. Seeds feel his influence, and unfold themselves in the bosom of the earth. By him all plants and vegetables spring up and grow. His approach re-animates and strengthens all living creatures. All that breathes, lives, feels, or vegetates, proves the benign influences of this majestic globe. How would it be, were we deprived of the light and heat of the sun? How dismal would the earth appear, now become an uninhabitable desert! The greater part of the creatures would fall into a state of stupor, and languish out a miserable existence. What a source of joy and gladness would our hearts be deprived of, if we no longer enjoyed the rays of the rising sun, nor the brightness of a serene sky! Nothing could compensate the loss of the rising sun. The mildest night, the most temperate artificial heat, could not supply the place of that vivifying influence which the light of the sun communicates to all beings: and which is widely different in salutary efficacy of terrestrial fire. This, both men and animals know and experience. An infirm person shut up in his warm room, with every assistance, will not gain as much strength in many weeks, as he would in a few days, under the mild influence of the sun in spring weather. Plants which are forced to grow by artificial heat, never come to that degree of strength and consistence as those do which grow under the rays of the sun. In this case, every thing combines for the perfection of the plant: whereas in those produced by artificial heat, we perceive only the weak and languishing efforts of nature's substitute, without her energy.

But could the sun exist, and could it communicate light and heat to us, if the great God, the Creator of all things, had not formed it, and given it power to diffuse its vivifying virtue over the earth? It is from the Lord alone, that all benefits derived through the medium of the solar influence, proceed. It is HE who has created the sun, regulated his rotation, and continues to maintain his light and splendour. Each morning he appears again, and we feel his salutary influences through all the seasons of the year. Without the Supreme Being, there could be neither sun nor light, warmth nor spring. The sun's beneficent warmth, his beautiful and pure light, should lead us to Him who is the Being of beings, and the source of all good; the Parent of happiness, and the Father of light. The heathens were too blind to acknowledge HIM in the sun; they stopped at the *effect*, without acknowledging the *cause*. But, how abundantly more happy are we, who know there could be no sun, if HE did not exist: and that the sun himself could neither enlighten nor warm, but by the determination of the Most High. We should know that vegetation, growth, fructification, all the blessings which surround us, all our

pleasing sensations, all that contributes to our happiness and delight, come from God. The sun is but the instrument of his goodness, the minister of his will, and the herald of his glory.

Doubtless, the world would be a lifeless desert, if deprived of the light and heat of the sun : and the heart of man, while destitute of the salutary influences, and the quickening grace of the Sun of Righteousness, is a barren waste, without life or joy. If our souls possess any life, any virtue, any happiness, it is from Him we have received them. All the other means which we can employ to become wise, pious, or happy, are of no effect without Him. I shall ever be a dead tree without leaves or fruit, if his saving grace do not quicken *me*. Lord Jesus, condescend therefore to lift upon me the light of thy countenance ! For all creatures languish after the sun, and long for his appearance ; so may my soul long for thy appearance, and look towards thee with the most ardent desire ! Refresh and comfort my feeble spirit, quicken and strengthen my depressed heart ! and may thy grace make me fruitful in every good work !

APRIL XXI.

RELATIONS WHICH ALL CREATURES HAVE TO EACH OTHER.

THE prodigious number of creatures on the earth, is a subject which well deserves our admiration : but what should engage our attention still more is, the proportion between these, and the wise relations which connect this infinite number of different beings, so that they form but one regular and perfect *whole*.

The extent of animated nature is incomprehensible, and, not withstanding, every animal finds a sufficiency of nourishment. No species, however few there may be of them ; no individuals, however persecuted they may be, become extinct. That numbers of them are food for others, must be granted ; but the number of rapacious animals is not great. Most of them are solitary, and do not multiply rapidly. Those which are pretty numerous do not require much food, and to procure it costs them much art and labour. Many have enemies which prevent them from becoming numerous. Or else the weak and timid animals supply in number what they want in strength : and by all sorts of cunning and address, escape their adversaries. It is also observable, that for the preservation and multiplication of species, there is an exact equilibrium between the two sexes, so that there is no animal but finds a mate with which it may associate.

The mineral kingdom is subservient to the preservation of animals ; and both serve for the use and benefit of man. The most useful plants, such as *wheat*, &c. grow wherever there are men and animals, are most easily multiplied, and least liable to decay. The most useful animals are every where found in abundance. The productions of different climates are suited to the particular wants of men.

Thus the hottest countries abound in cooling fruits. In countries liable to drought, there are plants and trees which are as springs of water, which furnish enough to quench the thirst of men and animals. If wood for firing be deficient in any place, there turf and coals are found in sufficient abundance. If there are countries which are destitute of rain, and other means of fertility ; they are recompensed by inundations, as those of the Nile in Egypt.

Among mankind also there is the most exact proportion found between the two sexes. The proportion between males and females is nearly equal. The number of males is to those of females, as 26 to 25. In civil society, goods and talents are distributed in an admirable manner ; that as each individual may be happy according to his circumstances, so nothing that is necessary is wanting to society in general. If the inclinations and propensities of men were not so varied ; if their tastes and tempers did not make them embrace different kinds of life ; if there was not such a diversity in genius and mode of reasoning ; in beauty, in riches, and in other external circumstances ; human society would be a gloomy desert. There is no class of men who can live independently of others. Every country has its particular advantages ; if these were common to all, there would be neither connexion nor commerce among men.

In short, withersoever we turn, we shall find the most admirable harmony, and the most exact proportions. Notwithstanding the infinite variety of creatures, and the continual interruption of some of the laws of nature, it appears that in this immense universe all is beautiful, and all perfectly connected and proportioned, so as to promote the general good : and all is in the most exact and regular order. " On whatever side I cast my eyes, I see nothing but the most beautiful connexion, and the most delightful harmony : it shines every where, it embellishes every thing ; nothing is unconnected ; all conspires to the same end, and to the general good. All is connected with the most astonishing art."

Wise Author of nature, may we adore and exalt thee with the most profound admiration ! We should be unworthy to contemplate the magnificence and harmony of thy works—we should dishonour our reason, we should dishonour thee, if we did not admire the depths of thy wisdom. And what can we do more ? While we live here below, we shall know only in part, and see only the outlines of thy admirable ways. What we know is little in comparison of that which is hidden from our eyes ; and yet the glimpse which we now have, shows thy perfections to be impenetrable, and incomprehensible. Open our eyes, O Lord, that we may see the miracles of thy wisdom ! Teach us to acknowledge this wisdom in all thy works, which are arranged with so much order and harmony ; teach us, above all, to admire that ineffable goodness which has regulated the whole in such a manner as to promote the utmost happiness of thy creatures.

APRIL XXII.

THE CONSTITUENT PARTS OF WATER.

WHEN we drink water we think we enjoy a pure and simple element : but we are mistaken ; for naturalists assure us that each drop of water is a little world, where the four elements, and the three kingdoms of nature, are united.

There is scarcely any water which is not full of heterogeneous matter, which is plainly visible when either distilled or filtered. However incredible the thing may appear, it is put beyond doubt by the most exact and accurate experiments.

Besides its elementary parts, water contains different earthy particles : such, for example, as appertain to the mineral kingdom ; calcareous earths, nitre, and different kinds of salts. This we shall not be inclined to doubt, when we consider the abundance of earthy matter which water must every where meet with, whether in the air, or in its course on the earth : which matter it either dissolves or carries along with it. Water contains also inflammable or sulphureous matter, which becomes manifest when it corrupts. Without these fiery particles, it would become a solid compact body : for as soon as it is deprived of its heat it congeals, becomes heavy, and acquires the hardness of a stone. Finally, that water is impregnated with air, is what we shall readily admit, if we attend to what happens when it begins to boil. Thus we see that water contains earth, salts, igneous particles, and air ; so that it is literally true, that all the elements are united in one drop of water.

But are plants and animals found in it ? It is certain that it contains the principles of vegetation, since all plants derive their nutritive juices from water ; and neither grow nor come to perfection without it. As to the animal kingdom, we have the utmost evidence that it is distinguishable in water. Without mentioning fish, and other aquatic animals, with which it is peopled, there is not a single drop of water but has its inhabitants, and these are easily discoverable by the microscope. Besides, we know how readily insects are generated in stagnant waters, the eggs of which are undoubtedly concealed in it, although some external circumstances may prevent them from coming forth.

All this is well calculated to make us reflect on the beneficent wisdom of the Creator. It is not by chance that water contains so many different particles. It would be the purest of all drinks were it an absolutely simple body ; but, on the other hand, its medicinal virtue would be reduced to nothing. If we consider the manner in which water nourishes plants, it is easy to presume, that it communicates the nutritious juices which it contains to men and animals in the same way. Water is not very nutritive by itself ; but being very subtile, it dissolves the nutritious parts of aliments, is a vehicle for them, and carries them along into the minutest vessels. It is consequently the

 Constituent parts of water.

most wholesome drink ; and is essentially necessary to men and animals ; and its salutary effects are felt where all other liquids are found hurtful to health.

How great should our gratitude be to God for every glass of water we drink ! With what goodness has he provided for our necessities ! He has prepared our food and our drink in that way which is best suited to our nature, and the most proper to preserve life and health. He has communicated a salutary virtue to the most ordinary and indispensable means of subsistence. Let God, therefore, be praised for the water which he has given us to quench our thirst, and to digest our food. And, supposing that we had nothing for the support of life but bread and water, let us learn to be contented with, and always grateful for them. Let us implore the blessing of God on the food we eat, and ask grace to use it with a satisfied and contented mind.

 APRIL XXIII.

OF THE PROPAGATION OF PLANTS.

VEGETABLES, in general, come from seeds : and in most plants it is the blossoms which produce and fertilize the seed. Almost all flowers are folded up in the bud, where they are formed in secret, and are defended by their coats and external leaves. When the sap flows abundantly, especially in spring, the blossom grows larger, the bud opens, the tunics fall off, and the flower becomes visible. At the outside some very small leaves are seen of different colours, which serve to protect the organs of fructification : and probably also to prepare the nutritious juice which enters into those parts. But it is properly in the centre of the flower that the organs of fructification are found. In it there is a thread, or little pillar, called the *pistil*, which rises pretty high, especially in *tulips*. Round the *pistil* are the *stamina*, surmounted with tops, which contain a prolific dust of different colours. The *stamina* are properly the male organs destined to impregnate the germs, and the *pistil* is the female part of generation : it is the womb which receives the fertilizing dust.

Vegetables are also propagated by grafts. From a tender branch of a tree when in sap, they take an eye, or commencement of a branch, with a part of the bark, and insert it between the bark and the wood of another tree, after which they bind the whole up gently, by rolling a soft cord several times round it. From this eye a branch proceeds, which is of the same nature with the tree from which it was taken, although the tree in which it was inserted be quite of another sort.

Trees, and other woody plants, are also perpetuated by *slips*. From a willow, for instance, a slip is taken, i. e. a single stick or branch : this, after having the small branches cut off, is thrust in the ground. The branches are taken away, that they may not in the be-

Propagation of plants.

ginning, take up much sap. Roots soon proceed from this slip, in those places where branches had begun to appear ; and it becomes a tree.

Lastly, vegetables are propagated by *roots* ; but these should have eyes, without which they will never grow. Certain plants shoot out long filaments in all directions, which have knots or eyes ; these knots extend their fibres in the ground, and become so many new feet, which may be separated from each other, and become so many new plants. A bulbous root is a species of eye, in which the plant is enclosed, between whose leaves there are little bulbs or eyes, so that the plant may be propagated by the leaves, when these little bulbs are attached to them.

What a concourse of causes must operate in order to produce, preserve, and propagate vegetables ! Allowing even that the germs pre-existed, what amazing art is necessary to unfold these germs, to give them their proper growth, and to preserve and perpetuate each species ! How fruitful a mother must the earth be, in whose bosom such multitudes of plants may be conveniently placed and effectually nourished ! Water, which also contributes to the growth of plants, though in a less degree, must contain all those particles, the mixture of which is necessary to make them spring up and grow. The sun must put all these elementary principles in motion, cause the germs to vegetate by its heat, and ripen the fruit.

It was necessary to establish a proper balance and exact proportion between plants, that on the one hand they might not multiply too fast, and on the other that there might always be a sufficiency. It was necessary also that the texture, the vessels, fibres, and all the parts of plants should be so disposed, that the sap, the nourishing juice, might penetrate through them, circulate in them, and be so digested and prepared, that the plant might receive its proper form, size, and strength. It was also necessary to determine exactly what number of plants should come of themselves ; and what others should stand in need of the care and culture of man. The work, therefore, of the generation and propagation of plants, is so complicated, and passes through so many different processes, that it would be impossible to unravel the long series of causes and effects by which it is brought about.

In all this, I acknowledge thy wisdom and goodness, O my adorable Creator ! Who, besides *thee*, could communicate to the elements that virtue necessary to perpetuate vegetables ? It is thou who hast given the sun that size and heat, necessary to act upon our earth, so as to produce such blessed effects. It is thou who hast created those elementary parts, of which plants are composed ; and which thou hast dispersed through the air, the water, and the earth. It is thou who hast established the laws of motion, who hast formed the atmosphere, and who produces by it rain, fogs, and clouds. It is thou who vivifiest the seeds, and who givest existence and growth to vegetables. The earth, at thy command, produces the plants annually. Each

Propagation of plants.

spring thou renewest the face of nature ; and thou crownest the year with thy goodness. Author of plants and men ! may thy goodness, power, and wisdom, be for ever celebrated ! Let earth and heaven proclaim the glory of thy great name now, and through all eternity !

APRIL XXIV.

DIVERSITY OF FEATURES IN THE HUMAN FACE.

IT is a very evident proof of the adorable wisdom of God, that although the bodies of men are so conformed to each other in their essential parts, yet there is so great a difference in their external appearance, that they may be easily and infallibly distinguished. Among so many millions of men, there are no two perfectly alike. Each has something peculiar which distinguishes him from all others, either in his face, voice, or manner of speaking. The variety in faces is the more astonishing, because the parts which compose the human face are few in number, and are disposed in every person according to the same plan. If all things had been produced by blind chance, the faces of men must as nearly resemble each other as eggs laid by the same bird ; balls cast in the same mould ; or drops of water out of the same bucket. But as this is not the case, we must admire the infinite wisdom of the Creator, which in diversifying the features of the face in so admirable a manner, has evidently had the happiness of man in view. For, if they resembled each other perfectly, so that they could not be distinguished from each, it would occasion an infinity of inconveniencies, mistakes, and deceptions in society. No man could ever be sure of his life, nor of the peaceable possession of his property. Thieves and cut-throats would run no risk of being discovered, if they could not be known again by the features of their face, nor by the sound of their voice. Adultery, theft, and other crimes, would go unpunished, because the guilty could scarcely ever be discerned. We should be every moment exposed to the malice of wicked and envious men : and we could not guard against an infinity of mistakes, frauds, and misdemeanors. And what uncertainty would there be in judiciary proceedings, in sales, transfers, bargains, and commerce ? What confusion in commerce ! What frauds and bribery in respect to witnesses ! Finally, the uniformity and perfect similitude of faces would deprive human society of a great part of its charms, and considerably diminish the pleasure which men find in conversing with each other.

The variety of features constitutes a part of the plan of the divine government : and is a striking proof of the tender care of God towards us : for it is manifest that not only the general structure of the body, but also the disposition of its particular parts, have been executed with the greatest wisdom. Every where we behold *variety*, con-

ned with *uniformity*; whence result the order, proportions, and beauty of the human body. Let all who consider this subject, admire the wise arrangements of the great Creator!

APRIL XXV.

GOD'S UNIVERSAL CARE OF HIS CREATURES.

ALL the creatures which live in the air, in the water, or on the earth, are objects of the care of Divine Providence. It is through this that so many different creatures are maintained in their particular states, that they live, thrive, propagate their species; and that each, according to its particular nature and faculties, accomplishes the end for which it was brought into being. Animals destitute of reason, are endued with organs, strength, and sagacity, suitable to their several destinations. Their instincts apprize them of what might be dangerous and hurtful, and enable them to seek, discern, and prepare the food and habitation which are destined for them. All this is supposed to be absolutely involuntary; not the fruit of reflection and choice; but that they are irresistibly impelled to it by those propensities which a superior power has given them for the preservation of their animal existence. They find suitable food and habitations; and there is no species of animals which is destitute of what is necessary to its subsistence and well-being.

Man is of a superior nature: but he comes into the world in a state of greater weakness, and has much more need of succour than most other animals. His necessities, faculties, and desires, are greater and more numerous, and demand more attention: he is therefore distinguished by a more marked attention, and enjoys greater blessings from Divine Providence. The earth, the air, the clouds, and the light of the celestial bodies, contribute more abundantly, and in a more diversified manner, to his preservation. God has distributed his blessings to all intelligent beings, with impartial love. To man's empire, he has subjected creatures destitute of reason, that their life and labour may serve for his support and convenience. What further merits our particular attention is, that all parts of the habitable globe furnish a sufficiency of nourishment for the creatures which live in them. Admirable effects of the Divine Providence!

Not only the fertile bosom of the earth, but also the vast expanse of air, and the depths of the sea, abound in proper food for the support of that innumerable multitude of animals which live and move in these elements. The treasures of the Divine goodness are infinite. The provision which God has made for all his creatures is adequate to their necessities, and can never be exhausted. The world does not decay. The sun constantly appears again with his usual heat and splendour. The fertility of the earth never diminishes: the seasons succeed each other in their proper order; and

God's care of his creatures.

the earth never fails to pay her annual tribute of provision for the support and preservation of her innumerable inhabitants.

Whether we consider the constancy, profusion, or variety of the means of subsistence, which nature furnishes in every place, we shall perceive every where the traces of a beneficent and universal Providence. All surrounding objects which serve to support and procure us the comforts and conveniencies of life, are so many visible means, so many canals, through which our invisible Benefactor distributes his blessings to us continually. The agents of nature are the ministers which accomplish the views of his providence. The world is his magazine, and we take out of it all that we need. To that goodness which is the essence of the Divine nature, to his paternal care, we owe all our blessings.

Father of beings ! how extensive, how great, how inexpressible are thy compassions ! It is in thee that we live, move, and have our being ; and thou supportest all things by the word of thy power. " At thy command the dew falls, and moistens and refreshes the thorn as well as the cedar. The lot of mortals is in thy hand ; and through thee alone they can be happy. Thou art the Supreme good, and thy fatherly cares extend to all the human race. Thy impartial goodness causes the sun to rise upon the wicked, even in the moment that he offends thee. It is by thy command that the breeze refreshes us, that the rose embalms the air with its perfume ; that the most delicious fruits please our palate ; and that the dew of heaven revives us. Thou dost proportion thy gifts to the necessities of thy creatures ; thou causest the righteous to experience the sweet and saving influences of thy grace. Thou givest to the bee the nectar of the flowers ; to the worm, the drop that quenches his thirst ; and to the world, the rays of the sun."

" O thou, who possessest sovereign felicity, who hast thy happiness from thyself, and who disdainest not to communicate happiness to the meanest insect, which could not exist a moment without thy support ; permit *me* to sing a new song unto thee, and condescend to accept my feeble accents. Penetrated with joy and gratitude, I would sing praise unto thy name, magnify thy goodness, and render thee that adoration, praise, and glory, which are thy due."

APRIL XXVI.

APRIL FLOWERS.

THE nearer we come to that charming month which presents to us the country, the meadows, and the gardens in all their beauty ; the more we see the wild and dreary aspect of nature wear off. Every day brings forward some new creation : each day nature approaches nearer to her perfection. Already the grass begins to spring up, and the sheep seek it with eagerness : the corn begins to appear in the

April flowers.

fields, and the gardens themselves begin to smile. Here and there flowers show themselves, and seem to invite us to examine them. The sweet-scented and modest *violet*, is one of the first children of the spring : its perfume is the more pleasing, because we have been so long deprived of such delicious odours. The beautiful *hyacinth* rises insensibly among the leaves, and exhibits its flowerets, which equally delight both the sight and the smell.

The *imperial crown* casts around it a multitude of starlike leaves : its stem rises very high, and its red and yellow bell-shaped flowers, hanging towards the earth, form a sort of crown which is surmounted with a tuft of flowers. From the midst of its leaves the *auricula* erects its starry flowers, the border of which excels the richness of satin and velvet. The elegance of its form, and the sweetness of its perfume, make amends for the shortness of its stature. The *tulip* comes out more slowly. It scarcely dares to unfold itself as yet, because the night air, and the cold rains, might at once obliterate the splendour of its colours. The *ranunculus*, the *pink*, and the *rose*, do not blow, till milder days permit them to show themselves in all their beauty.

Here an attentive observer will find many occasions to admire the wisdom and goodness of the Creator. It is for very wise purposes that at the return of this beautiful season, each plant begins to unfold its leaves and flowers precisely in the time and order prescribed ; and to make complete preparation for the production of its fruits.

In the vegetable kingdom one species succeeds another, from the beginning till the end of the year. Some have but just showed themselves, when others prepare to appear : and these are followed by many hundreds of others which show themselves, each in its turn, at the appointed times. While one plant brings its fruit to maturity, nature excites some other to propagate, that its fruit may be ready when the former has accomplished its end. Thus nature offers us continually a pleasing succession of flowers and fruits ; it leaves no void, and from one end of the year to the other it watches over the successive generation of plants.

But why has not the Creator permitted us to enjoy a greater number of plants at once ? The reason is very evident : If all flowers and fruits appeared at the same time, would there not be seasons absolutely destitute of vegetables ! Should we not then be deprived of the pleasure which these pleasing and progressive changes procure us ; which prevent that disgust which inevitably arises from sameness ? How many plants must perish, were they exposed to the cold nights which are often felt in the commencement of spring ? Would so many millions of animals and insects find sufficient nourishment, if all plants flourished and bore fruit at the same time ? The beneficent Creator proposed to make provision for our support and pleasure : but these two designs could not be accomplished, but in causing nature to produce the vegetables, not at the same time, but successively and by degrees.

 April flowers.

The spring flowers, which we at present contemplate and admire, should naturally lead us to think of youth, that fine early spring and flower of life. Amiable and sprightly youth, consider in these flowers the emblem of thy destiny. Thou art placed in a fruitful soil, thou hast a thousand charms which cause thee to be loved and admired. But hast thou not observed how soon the *violet*, the *auricula*, and the *hyacinth* fade, when the cruel north wind passes over them? Ah, think of the fate that threatens thee! Young man, glory not in thy form, and venture not to mix too soon in the sports of thy companions, whose strength of body is superior to thine! Boast not in the flower of thy youth. Life is as grass; thou flourishest like the flower of the field; but the wind passeth over it, and it is gone, and the place thereof shall know it no more. Ps. ciii. 16.

 APRIL XXVII.

RETURN OF THE BIRDS.

A SMALL number excepted, who pass the winter with us, whole tribes of birds have emigrated to other countries. Some seek milder climates than ours; and others find safe retreats, and a sufficiency of warmth, in caves, holes of the earth, and other private places. These birds return to us by degrees. The gentle mildness of the spring awakes the *swallows* from their torpor. And a secret instinct brings back those others, which in the last autumn had undertaken a long voyage beyond the seas, to find that subsistence and temperature which their constitution required.

Their return is generally in this order, those which went away latest, return first. The air is about to be re-peopled with its winged songsters. The *nightingale* shall soon cause the thickets to resound with her melodious notes: the *swallow* will return to the nest, which was constructed the last summer: and the *stork* will find again the very house which she had left at the beginning of the winter. In a few weeks the air will again resound with the singing of birds: and their return will bring back joy and gladness into our plains and valleys.

Two things are particularly remarkable in the emigration of birds; first, that they know exactly the time in which they should return. The *stork* in the heavens knoweth her appointed times, and the *turtle*, and the *crane*, and the *swallow*, observe the time of their coming. (Jer. viii. 7.) Undoubtedly, the temperature of the air, relative to heat and cold, and the natural inclination which these creatures have to produce and bring forth their young, are the strongest motives which lead them to change their habitation; but it is in other views a very singular instinct, and in many respects inexplicable. Secondly. It is not less astonishing, that these animals, destitute of reason, should know so exactly the path they ought to take, and how far they should go.

Return of the birds.

Without compass or provisions, in the most regular order, they undertake and finish a voyage which is sometimes more than 1000 miles long!

Who is it that has taught them to follow a certain tract in an element so inconstant as the air? Who tells them how much they have already travelled, and how much of their journey yet remains? Who is it that guides, nourishes, and supplies them with every necessary during their voyage? Do not these animals effect what men themselves could not perform? Were we to undertake such long voyages, what experience, what provisions, what directions, and what preparations should we require? Could we, assisted by our reason, by the compass, by geographical charts, follow so invariably the road over so many seas and mountains, as these birds do, without any assistance?

In whatever light we consider this, we cannot but consider a power superior to the simple instinct of animals. Yes, Lord, we discover in this, thy almighty influence: it is thou who hast impressed on the minds of these birds that instinct which they seem blindly to obey. Thou appointest to each the country, and even the tree and cottage, where he may find his food and habitation. Thou leadest them through their distant migrations, and thou hearest their cries when they call for nourishment.

O my God and Father, may I, with the most filial confidence, trust my lot and my ways to thy direction! I am a pilgrim upon earth, lead me in the way which is pleasing to thee, and may I walk in it without murmuring! Guided by thee, I shall fear no evil; and I trust, through thy goodness, to find, with my subsistence, some measure of repose and comfort! Should I be obliged always to lead a wandering and restless life here below, do thou comfort me with the hope that I shall at last arrive at that place of eternal rest, peace, and happiness, whence no evil can ever banish me!

APRIL XXVIII.

THE UTILITY OF FORESTS.

DURING the winter which is just past, many have sensibly experienced the great utility of forests in furnishing fuel to preserve them from the intense cold. But it would be a mistake to suppose that is their only, or even their principal use. For if God in creating them had proposed no other end than this, why should he have created such immense forests, which form an uninterrupted chain through whole provinces and kingdoms, the smallest part of which is employed for fuel? It is manifest then that the Creator, in forming those vast forests, intended to procure other advantages to men.

May not the pleasure we feel at the sight of woods be one end for which they have been created? They are one of the greatest beauties of nature: and it is always an imperfection in a country to be

Utility of forests.

without woods and thickets. Our impatience when the leaves in spring are long in appearing, and the pleasure we feel when they do appear, make us sensible how much they adorn and embellish nature. In reflecting on the utility of woods, we should not forget the fruits which numerous families of trees produce. It is true, there are some trees whose fruit does not appear to be of any direct use to man ; but supposing even that there are many fruits which can be of no possible advantage to us ; yet the trees which bear them are always useful, were it only for their beauty, their shade, and the timber they produce.

Besides, if we reflect properly, we shall acknowledge that those trees which we style *barren*, are nevertheless of great use to us. Their fruits nourish an infinity of insects which become food for those birds which are destined to afford us the most exquisite dainties. The acorns of all the different species of oak, the nuts of the beech, and various matters of this sort, are the favourite aliment of swine and wild boars ! And have we not lately found that these fruits, when properly prepared, may even become food for man ? Besides, they serve to provide seed to perpetuate the forests. How many sorts of animals are there, to whom Providence has allotted the woods both for their nourishment and habitation ; and who must perish, were there no forests ? Of how many conveniencies, utensils, household goods, and medicines, should we be deprived, had we not the wood, bark, and roots of trees ! How dull and dismal would the face of the earth appear, were it not for the charming diversity of fields and woods ; of plains and forests !

It is because forests are of such great utility to men, that nature herself has taken care to perpetuate them. If their generation and propagation had been left to the industry and vigilance of men, they would have been extinct long ago. But the Creator has preserved the trees of the forest : he alone has planted, and he alone supports them. It is he who disperses their little seeds over an extensive country. It is he who has given wings to numerous seeds that they may be the more easily carried about by the winds, and scattered over a great number of places. He alone, from these seeds, has caused those vast bodies to shoot up so majestically in the air, and which raise their lofty heads to the clouds. He alone has established them by their strong and widely spread roots, so that for many ages they brave the insults of the winds. It is he who brings the rain and the dew out of his treasures, sufficient to clothe them annually with new verdure, and to maintain a kind of immortality among them.

Compassionate Father ! thy goodness extends over all the earth. There is no country, however remote or wild, where the footsteps of thy wise and beneficent empire are not seen. Every where, in fields, in forests, in the parched deserts, in the flowery plains, thou hast erected monuments of thy goodness, because thou art the God of love and grace. Now that beautiful season comes, in which we may walk under the shade of the lofty oaks ; then, penetrated with gratitude and

Utility of forests.

joy, we may lift up our hearts unto thee, and sing praises to thy name. Then shall we magnify thee, not only for thy blessings in general, but also for the forests which thou hast caused to spring up for the good of thy creatures.

APRIL XXIX.

PLEASURES WHICH THE CONTEMPLATION OF NATURE AFFORDS.

NATURE offers to all her children, with maternal kindness, the chief, the most innocent, the least expensive, and the most universal of all pleasures. It is that which our first parents enjoyed in the garden of paradise : and it was only the depravation of men that led them to seek for other recreations. Men are accustomed to despise the blessings which they constantly enjoy, how excellent soever they may be ; and they think of nothing but of multiplying and diversifying their amusements. But the pleasure I speak of, is preferable to all others. It is almost impossible not to find charms in the contemplation of nature. And that it may be enjoyed without expense, is manifest : the poor, as well as the rich, may possess this pleasure. Yet, this is the very thing that lessens its value. We are foolish enough to disregard that in which others have an equal share ; whilst, if we were reasonable, nothing should enhance the value of a blessing more than the thought that it constitutes the happiness of our fellow-creatures, as well as our own.

When compared with this noble and affecting pleasure, how frivolous and deceitful are those far-fetched amusements which the rich procure with so much trouble and expense ? They leave a certain vacuum in the soul, and always end in vexation and disgust. On the contrary, rich and beneficent nature continually presents new objects to our eyes. All the pleasures which are the work of our imagination, are of short duration ; they are as transitory as a beautiful dream, the charms and illusions of which vanish as soon as we awake. But the pleasures of reason and of the heart, those which we taste in contemplating the works of God, are solid and durable. The heavens adorned with stars, the earth enamelled with flowers, the melodious singing of birds, the different landscapes, and a thousand prospects, each more delightful than another, continually furnish us with new subjects of satisfaction and delight. If we are insensible to these, it is certainly our own fault : it is because we view the works of nature with an inattentive and indifferent eye. The grand science of a Christian consists in deriving good from every thing, in having the art to render himself happy in all circumstances, and to enjoy innocently whatever surrounds him, without injuring his virtue.

Beneficent Creator ! thou rememberest us in this beautiful season, and thou providest for us an abundance of the most solid pleasures. Thou openest a thousand sources of delight, and joy and gladness

Pleasures which the contemplation of nature affords.

penetrate our hearts from every quarter. If we wish to elevate our hearts to thee, to indulge holy meditations, to feel celestial pleasures, all nature furnishes the opportunity. O may we ever prefer this noble satisfaction to all the pleasures of sense! In those days of spring, may the sight and enjoyment of delightful nature affect us more than those seducing pleasures which flatter the senses, but which interest not the mind! Lord, teach us to acknowledge and feel thy power and goodness! For it is only in studying to find *thee* in all thy works, that we open to ourselves a pure and unfailing source of delights; and that we may enjoy, here below, a foretaste of that abundance which we shall experience in thy presence for ever and ever!

APRIL XXX.

THE BRUTE CREATION SHOULD LEAD MEN TO GLORIFY GOD.

IT is not sufficient to treat animals so as not to abuse them: we should make the best possible use of them: and how can we do this better than by making them subjects to glorify God? All creatures may lead to this; but especially those which are animated: on every plant, tree, flower, and stone, the magnificence and glory of the Creator are visibly impressed; and we have only to open our eyes to see this; but in the animal kingdom this is more particularly manifest. Examine the structure of one living creature: what art, what beauty, what a series of wonders, do we discover in it! And how are these wonders multiplied when we reflect on the almost infinite number, and astonishing variety of animals!

From the elephant to the smallest mite, which can only be discovered by the assistance of the microscope, what gradations, what links, forming one immense uninterrupted chain! What connexions, order, and relations, do we see among all creatures! All is harmony:—and if at first sight we suppose we have discovered any imperfection in certain things; on proper examination, we shall find that it was *our* ignorance only that caused us to form a false judgment. It is not necessary that every individual should make deep researches into the nature of animals: it is not necessary that every person should become a profound naturalist: it is sufficient to pay attention to what is most common, and best known, in order to be convinced of the above.

We see, for instance, a multitude of animals which are formed in an admirable manner; and who all live, feel, and move as we do: who, like us, are subject to hunger, thirst, and cold; and who, consequently, like us, stand in daily need of having these wants supplied.

To all these creatures God has given life; he preserves them, provides for all their necessities: he cares for them as the father of a family cares for all the members of his household. May we not con-

The brute creation should lead men to glorify God.

clude from this, that God has the goodness and tenderness of a Father? May we not further conclude from this, that *we* should love this God, who is love itself! If the Creator extends his bounty to these animals, what will he not do for us? If it be his study to render the life of irrational creatures sweet and pleasant, what may we not expect from his beneficence? Let the feeble-minded and distrustful man blush at his anxieties, who, as soon as he is deprived of affluence, falls into despondency, fearing that God will permit him to perish for want. That beneficent Being, who provides for the necessities of so many irrational animals, will take care to provide for man whatever is necessary.

Let us reflect also on the instinct of beasts; and take occasion from this to glorify that Supreme Being who has, with so much wisdom, combined the end with the means. As these instincts in animals relate all to their preservation, they are more particularly manifest in the love and tender solicitude which they feel for their young. To point out the most tender and paternal care, our Lord himself makes use of the image of a hen gathering her young under her wings. It is indeed a very affecting sight to see that strong and natural affection which a hen bears to her young ones, and the constant care she takes of them. She never turns away her eyes from them: she flies to their succour at the least appearance of danger: she courageously opposes every aggressor, she risks her own life to save that of her young. She calls and comforts them with her maternal voice, she extends her wings to receive and cover them: she neglects all sorts of convenience to herself, and sitting in the most painful posture, she thinks of nothing but the safety and well being of the objects of her love.

Who can help here discovering the finger of the Most-High! Without this maternal solicitude, without this instinct, so powerful, and so superior to every thing, the hen herself, the chicks, and the whole race, must infallibly perish. Can it be said that what the hen does for her young, she does it with understanding and reflection: that she judges, reasons, foresees, combines, and makes inferences! This is much to be doubted; and though at first sight it seems that all this proceeds from the maternal tenderness and understanding of this bird, yet we must acknowledge there is a superior hand, which makes itself manifest, teaching us *how* it acts.

These two examples I believe sufficient for the proposed end: and without extending the subject further, I will conclude in a few words: It is the duty of man to seek in the brute creation an occasion to glorify God; an indispensable duty which we should hold sacred, and which will ever prove both instructive and delightful.

Hymn of praise for the works of creation.

APRIL XXX.*

A HYMN OF PRAISE FOR THE WORKS OF CREATION.

LET us adore our great Creator, and sing praises to Him.—Homage, honour, strength, dominion, and glory, be rendered unto the Supreme Being! Let us adore him, he has created us; let us be joyful in him; let us give him eternal praises, for by him alone we exist. Hallelujah! He has created the world, and he sustains it. Let all creatures adore him! O world! sing to, and proclaim thy Author.

Eternal silence is ended!—The Deity has interrupted it to make and pour upon *man* that blessedness of which he is the source. *Be!* said the Almighty, and, at his command, heaven and earth sprang out of nothing.—Jehovah is no longer *alone*:—already the cherubim, the first-born of his power, cause the heavens to resound with songs of praise. Hallelujah!—But the light which is to illuminate the world does not yet appear. He speaks, *Let there be light*,—the light darts forth.

He forms a solid arch out of the waters, and suspends the sea under it.—But as yet, the waters cover the mountains: He thunders—the winds blow—the waters disperse: He directs their course, and the earth is now separated from the veil which before covered it. The *earth!* His domain, the theatre of his glory: and at last to be the empire of his Son.

He speaks, and the fields, the hills, the vallies, the mountains, and the forests, flourish; they become fruitful at his powerful word. The sun from the exalted place of his abode, rules over the days and years; while the peaceable and silent empire of the moon and stars is extended over the night. He speaks, and the sea is peopled with living creatures. Hallelujah! The air also is stocked with birds, whose harmonious notes celebrate that God who has called them into being.

O man, ask universal nature, ask the wild beasts, who, free from the yoke, sport in the forests; ask them from whom they have derived their existence, their liberty, and their happiness. Ask the deserts who it is that has given them the *lion*, the terror of animals, to be their king?—It is God: God, great in counsels, and terrible in working!—The swift *courser*, the tender *lamb*, the docile *ox*, all come from Thee; and all exclaim, The Lord he is God! The Lord he is God, and there is none else.

Repeat your adorations:—redouble your hallelujahs:—sing, and let your notes become more sublime!—He says, “Let us make man. Let us make him in our own image.”—Adam exists! Adam astonished sings, He is my creator.—God!—Jehovah!—Sabaoth!—Hallelujah! The Lord he is God, and there is none other.

Let us eternally celebrate this Being of beings! Glory, honour, praises, thanksgiving, to HIM who has created us! to HIM who has made us immortal! O God, in whom we live, move, and have our being, we

Hymn of praise for the works of creation.

rise towards Thee with songs of joy. Hallelujah! He has created the world, and he sustains it. Sing, O world, sing to, and proclaim thy Author.

THE SAME IN VERSE.

O COME, the great CREATOR's Name,
 In lofty lays adore!
 Dominion, honour, glory, fame,
 Be his for evermore!
 BEING SUPREME: Let us applaud,
 In tuneful songs, the LIVING GOD,
 In whom we live, and move, and are;
 The world he made, his hand sustains:
 The mighty theme, in choral strains,
 Let every being share.
 Wide as thy realms, O beauteous world, expand,
 Announce his mighty Name, proclaim his forming hand!

No more eternal silence reigns:
 With eloquence Divine,
 The voice of Deity maintains
 The dignified design.
 Blest Fount! himself to pour on man;
 "Be!" said the Pow'r; at once began
 Th' unavailing heav'ns, the earth, to be.
 No more JEHOVAH dwells alone,
 But new-born cherubs fill his throne
 With hymning harmony:
 Not yet does light on infant nature gleam;—
 "Let there be light!" he said: forth darts the lucid beam!

From out the watery waste he bends
 A solid arch on high;
 And on his word the sea suspends,
 Beneath the concave sky.
 Yet flow the waves the mountains o'er—
 But hark! his pealing thunders roar!
 Wild through the deep his tempests blow;
 Her ambient liquid vail withdrawn,
 Earth lifts her oozy head; while on
 Meand'ring rivers flow.
 His glory's ample theatre appears,
 Fair empire of his Son, in late succeeding years!

He speaks! the plains, the mountains green,
 The God's behest obey;
 The fragrant vales, the groves serene,
 The genial boon display.

Hymn of praise for the works of creation.

O'er the bright day, and circling year,
 The sun in his exalted sphere,
 While o'er the silent nightly hour,
 The silver moon her sway maintains;
 Again he speaks! The liquid plains
 Their finny nations pour;
 While birds melodious in mid-air prolong,
 Responsive to his praise, the tributary song.

Go, ask all nature; ask, O man,
 The wand'ers of the wood,
 With whom their being—bliss, began?
 Who gives the sylvan food?
 Free from the yoke, who bids them rove,
 Their wide domain, the pathless grove?
 Who founds the lordly lion's throne?
 'Tis GOD, 'tis GOD, in counsels wise!
 "'Tis GOD! 'tis GOD!" all being cries,
 JEHOVAH! He alone!"
 The docile ox, swift courser, humble lamb,
 JEHOVAH is our God! all, all, aloud proclaim.

Your adorations re-repeat,
 Your hallelujahs raise,
 Sing more sublimely, sing more sweet,
 Advance your loftiest lays.
 'Tis now the high transcendant hour;—
 "Let us make man!" th' OMNIFIC POW'R,
 The FORMING DEITY has said,
 "In our own image, fair and good,
 "The being form with mind endued,
 "To rule the works our hands have made!"
 Adam exists! his wond'ring powers applaud!
 "Hail, JAH JEHOVAH; lö JAH SABAOth, God!"

O let us this primal CAUSE,
 Eternally adore!
 Dominion, blessing, might, applause,
 Be His for evermore!
 Whose pow'r, whose goodness, made us Man,
 The life immortal who began,
 And pour'd it in the human breast.
 To Thee, in whom we live and move
 On hymns of joy, on hymns of love,
 We rise in Thee to rest.
 The world he made, JEHOVAH's hand sustains!
 O world! thy MAKER sing, long as the world remains!

A hymn on the beauties of spring.

MAY.**MAY I.**

A HYMN ON THE BEAUTIES OF SPRING.

BLESSED children of God, open your hearts of joy ! Behold the gay attire, and the rich gifts of spring. Contemplate the beautiful enamel which colours the fields and the meads ; their fruits shall shortly bring us both abundance and joy.

That tree which a little time ago seemed deprived both of sap and life, is now covered with blossoms, and promises an abundant harvest. How beautiful is nature ! How graceful are her ornaments ! Men and animals, meadows, woods, and fields, all revive, all feel themselves inspired with new life.

The *lark* mounts aloft in the air ; the *pigeon* leaves her retreat to fly over the flowery plain ; the *nightingale* causes her melodious and plaintive sounds to be heard ; her tender accents are heard over all the fields ; they fill the hills, the vallies, and the woods.

Here the fruitful *hen* guides, protects, and covers with her wings, the feeble new-born flock which nature has entrusted to her care. The *swallow* has left her nest ; but her tenderness recalls her : quickly she flies back, and carries to her young ones the desired nourishment.

The corn grows in abundance ; the joyful labourer and his children calculate the blessings which futurity prepares for them. Man plants ; but who waters ? It is thou, O Father of nature, who sendest down the rays of the sun, and the fertilizing rain.

The heat of the sun gives vigour to the juices of the earth, and causes the refreshing liquor to proceed from the feeble vine. Thus, he who appears abject in the eyes of men, when animated with celestial might, often becomes an honour to humanity, and a herald of the glory of God.

Almighty and Omniscient Being ! How does thy goodness manifest itself to us in this life ! What then are the pleasures, what the felicity, which thou hast reserved in thy eternal abode for the souls which repose their confidence in thee !

MAY I.*

THE SYSTEM OF THE WORLD.

THE sun, of all the parts of this system, is that which most interests us. His form is spherical, and he is composed of an igneous matter, which never consumes itself. By the telescope we discover, in cer-

The system of the world.

tain places, spots of different magnitudes, which prove that he has a revolution round his own axis. His distance from the earth is 95 million 173 thousand miles ! He is at least a *million* of times larger than our earth, the diameter of which is nearly eight thousand miles. He communicates his light and heat to at least *twenty* opaque globes, which revolve around him at different distances ; and which are termed *planets*. The nearest to him is the planet *Mercury*, who is buried in his rays ; and on this account it is that he is less known than the rest of the planets. A little farther off is *Venus*, who is called *Lucifer*, or the morning star, and *Hesperus*, or the evening star ; because sometimes she precedes the sun, and sometimes follows, and sets after him. After *Venus* comes our *globe*, the external surface of which is composed of earth and water, mountains and vallies : the internal parts consists of beds, or *strata* of different substances.

The *earth* is the abode of a multitude of creatures, both animate and inanimate. As also of metals, minerals, and plants. The *moon* revolves in a particular orbit round the earth, and accompanies it through the whole of its revolution round the sun. She is about *fifty* times less than the earth : on her face we easily distinguish lucid and brilliant spots ; and others which are obscure and gloomy. The first appear to be continents, and the other seas or deep vallies. If the moon were only composed of one matter ; if she were a body entirely solid, or entirely fluid, she would equally reflect, from every part, the rays she receives from the sun ; and we should not see the spots which we now discover in her. A fluid body, such as water, absorbs a great number of rays, and reflects but a few. It is, therefore, apparent, that the obscure parts of the moon are *seas* which absorb the rays of light, or very deep *vallies*, into which the rays are prevented from falling, by her mountains ; and the luminous parts, *land*. Among these lucid spots, there are some found more brilliant than others, and which even cast a shadow. It is therefore evident, that they are higher than the others ; and thus they resemble the mountains of our earth. Some of these mountains appear unconnected, and others are contiguous, and form long ridges. In the lunar seas, we discover parts not so obscure as others ; and which consequently appear to have a conformity to our isles.

The four last planets of our system, are *Mars*, *Jupiter*, with his four moons, or satellites ; *Saturn*, with his seven ; and the planet *Herschel*, or *Georgium Sidus*, with his six moons.* Spots are observed on

* Two new celestial bodies which most astronomers have agreed to name *planets*, have been discovered in the commencement of this century. The first of these called *Ceres*, was discovered on the 1st of January, 1801, by Mr. *Piazzi*, astronomer, at Palermo, in Sicily. It is a very small globe of about 200 miles diameter, appearing through a telescope as a star of the 8th magnitude ; and moves in an orbit between *Mars* and *Jupiter*. Other elements of this planet are the following :

Place of the ascending node	2° 20' 58"
Inclination of its orbit	10 47
Place of Aphelion	2 9 0
Eccentricity of orbit	0,0364.

The system of the world.

some of these. *Saturn* is at such a distance from the sun, that it takes him nearly *thirty* years to finish his revolution. This vast dominion of the sun, which, taking in *Saturn* only, extends to more than 900 million of miles, is but a part of the universe. But the planet *Herschel* being at twice the distance of *Saturn* from the sun, has doubled the bounds formerly assigned to the solar system. Each of the fixed stars (the number of which appears to be greater than the sands on the shore) is a sun, which, if it surpass not ours, is at least equal to him in magnitude and brightness, and whose dominion may probably extend further than that of the sun.

Behold the magnificence of the works of God ; for thus the heavens declare his glory. With what glory does the majesty of the Creator blaze in these marvellous works, which invite us, in the most earnest manner, to pay our tribute of admiration, reverence, and praise to the Being who has formed them ! Is there any thing in nature more proper to inspire us with exalted ideas of the Deity than the aspect of the celestial vault ? Let us never lift our eyes toward heaven, without feeling the most lively sense of the magnificence and grandeur of Him who has given being to all things ; and who preserves them with an incomprehensible wisdom, power, and goodness ! What are *we*, weak and miserable mortals, who creep as insects on a grain of sand, and are lost in the immensity of creation ! What are *we*, in comparison of those innumerable systems, which comprehend so many vast globes ! especially, what are *we*, in comparison of the Creator of all those worlds, of all those suns, of all those heavens, which we cannot attempt to comprehend or enumerate, without feeling trouble and confusion of mind ! Nevertheless, this Sovereign of the world condescends to prefer *us*, he deigns to honour us with his notice, and with his paternal care ! What a glory, what a ravishing hope opens before us ! What motives to the most lively gratitude ! Let us prostrate ourselves at the footstool of the Most High, and adore HIM in the firmament of his power.

MAY II.

REFLECTIONS ON THE BLOSSOMS OF TREES.

NOW our gardens and fields are decorated with the ornaments of spring ; all Europe appears in the same pomp, and presents every

Greater Semiaxis 23 times that of the earth's distance.

Periodic time 4. 13 years.

The second was discovered March 28th, 1802, by Dr. *Olbert*, of Bremen, who has named it *Pallas*. It is a very small globe of about 140 miles diameter ; revolves between *Mars* and *Ceres*, at a distance of about two and a half the Earth's distance, and performs its revolution in about *three* years.

I have not introduced these two erratics into the above account of the solar system, not being fully satisfied that they belong to the class of *planets* properly so called.

A. C.

where the most smiling aspect. By the virtue of that first word which the Creator pronounced in forming the world, all these magnificent effects have been produced. One hand only, that of the Creator and Monarch of the world, in a few days, has renovated the earth ; and, so to speak, has created it anew for the advantage and pleasure of his intelligent creatures. It is God, who calls forth the spring ; it is he alone who orders it to appear, because he is the Lord who has formed it. Approach, O man ! come and try what thy wisdom and power can execute ! Art thou able to make one tree blossom ? To produce a single leaf ? To call from the earth the smallest spire of grass ? To order one tulip to appear in all its splendour ?

Approach, ye learned artists, ye eminent painters, contemplate these flowers, examine these masterpieces with the most scrupulous attention. Is there any thing wanting to make them more perfect ? Can you find any fault in the blending of the colours ? Any in their forms, or in their proportions ? Can your pencil express the dazzling red of the *peach* blossom ? Can you imitate the pure enamel, the uniformity and simplicity of dress, of a *cherry-tree* in blossom ? What do I say, *imitate* ?—Are you only able to *conceive* all the magnificence of renovated nature ? Or to form a just idea of its inimitable art ? If there were not on the earth proofs still more convincing of the power and wisdom of God, the flowers of spring would alone suffice to render them indubitable. Surely the Lord manifests himself in every part of the creation. Every where, and in every thing, his power is manifested in the most sensible manner. Every tree that blossoms, every herb, every flower, proclaims that his goodness and wisdom are extended over the whole earth.

We observe an infinite diversity among the blossoms of trees : all are beautiful, but their beauties are different. One surpasses another, but there is not one which is not valuable because of some beauty peculiar to itself. How magnificent soever the Creator may be in the distribution of his gifts, he always takes the liberty to distribute to some more, to others less : but this difference only takes place in respect to accessory qualities. For instance, one tree has blossoms of a dazzling white : those of another have red streaks, and shades blended with that white. Others render the beauty of their form and colours more valuable, by the exquisite perfumes which they exhale. But all these varieties so multiplied are only accidental, and do not at all affect their fecundity.

Thus, while the Lord denies *us* the same advantages which render some of our brethren conspicuous, we should neither be discouraged nor afflicted. The loss of some accidental beauties, of what nature soever they may be, can in no respect injure our genuine well-being. If we are not as rich, as reputable, or as well formed, as others ; we may, nevertheless, be as happy, as holy, as pleasing to God, and as useful to men. Provided we bear the fruits of piety and righteousness, we possess true beauty. Why do the blossoms of trees please us more than the rich colours of a *tulip*, an *auricula*, or a *ranunculus* ? It is because

the pleasure we receive from viewing the latter is very short, whereas we expect from the others delicious fruit. Let us not, therefore, confine our wishes to the splendour and exterior charms of a beautiful flower. Beauty, comeliness, the tints of health, and other external advantages of this nature, are not what can procure us solid and permanent profit. The blossoms, which promise pleasing fruits both to God and man: these, and these only, truly merit our esteem, and these are they which shall never fade.

It is a melancholy thing, without doubt, to consider that all these dazzling beauties, which we admire in the blossoms of trees, shall disappear in a few days. And such shall speedily befall all those blooming youths, who are now so vain of their charms. Let this thought always accompany us, in the solitary walks which we take in our gardens, and hereafter let our principal study be, that when the beauty and charms of our bodies shall have vanished away, they shall appear to be replaced with the abundant fruits of virtue and piety.

A tree which has borne beautiful blossoms, and which nevertheless is found destitute of fruit when the summer is come: and only hinders, by its shade, the growth of the plants around it; is looked upon with indifference, or even with contempt, by those who delight in gardens. It is not less melancholy to see a person, who, in his youth, was adorned with all the charms of person, and the gifts of fortune, at present, in the summer or autumn of his life, not only bearing no fruit, but becoming a hinderance to the fruitfulness of others. Should we be permitted to arrive at that period, when God and society have a right to expect much fruit; may we be found as fruitful as we have sometimes seen a peach-tree; every blossom of which has been succeeded by a fruit! Then shall we have the praise of our fellow-creatures; and what is of infinitely greater importance, the approbation of the Most High.

MAY III.

THE CONTINUAL REVOLUTIONS AND CHANGES WHICH TAKE PLACE IN THE EARTH.

MOTION and change seem absolutely necessary for the preservation of the corporeal world. There is not the smallest particle of matter in the universe, that can be considered as in a state of perfect and continual rest. Nothing can be more easily demonstrated than this, if we pay the slightest attention to what passes on the globe on which we dwell.

The earth turns round its axis in twenty-four hours, and by this rotation all the points of its surface, except the poles, change their situation with more or less rapidity. Under the *equator*, where this motion is performed with great celerity, each body passes through more than one thousand miles in an hour, though it does not change

Continual revolutions and changes in the earth.

its place on the surface. But besides this, the earth makes her annual revolution round the sun with so much velocity, that according to the most moderate calculation, it goes through 1136 miles every minute, or 68,160 in an hour : although this motion is not perceivable. Motion relative to earthly bodies is more observable : small streams in uniting together form greater, those produce others in their turn, and thus torrents, rivers, and floods are formed, which are afterwards lost in the sea. This is not all : in every place plants and animals have need of water for their nourishment. Water is raised in vapours, these form clouds, which fall down in rain, snow, and fogs ; these form rivers which go again into the sea. Tides, storms, torrents, &c. keep the water in continual motion.

The atmosphere also is in perpetual motion. An east wind blows continually between the tropics : and though in other places, at particular times, no agitation can be perceived ; yet the barometer and thermometer prove that the air is never perfectly calm : and the frequency of different kinds of meteors sufficiently proves that nature is never at rest. The crust, or surface of the earth, is also subject to frequent revolutions. The hardest rocks cleave, stones break, and wear away by little and little. Some lands sink down ; others are inundated ; others raised ; and others overwhelmed by earthquakes. Little hills are borne away by the waters, vallies are filled up : marshes dry up and are covered with trees : the bottom of the sea becomes firm ground, and many such alterations take place. Light and darkness, cold and heat, drought and wet, succeed each other by turns. Finally, continual variations of heat cause frequent changes in different parts of bodies, though often imperceptible.

If we add to this the motion that is observed in animals, we may get some idea of the continual revolutions to which all things below are subject. Man himself is supposed to lose two ounces and a half daily by perspiration. This is replaced by other matter, so that at the end of a few years man is clothed with a new body. All animals and plants are nourished, grow up, propagate, and turn to corruption.

Thus, all is in motion on our earth, every thing grows and perishes alternately. In a word, to be *born* and *die*, is the sum of all that passes on the theatre of the world.

But this does not happen by chance or accident, as might be supposed at first view ; all takes place by order and design : all is regulated according to certain laws, which tend to certain ends. Every thing combines, every thing concurs, in the most perfect manner, to the glory of the Creator : every thing contributes to, and all terminates in, the good of the universe.

Finally, these continual revolutions are salutary warnings to us ; they teach us that this present world cannot be the place for which we were destined. When we consider the continual vicissitudes which all things on earth undergo ; is it not the most pathetic lesson on the vanity of terrestrial things, on the frailty and shortness of life ; on the necessity of a better and permanent state in the world to come ? Yes,

Continual revolutions and changes in the earth.

every thing conducts us to our true end : every thing proclaims to us, that we are *strangers* and *pilgrims* upon this earth. With what consolation may our souls be penetrated, when, in the midst of these worldly revolutions, we lift up our eyes to thee, O Lord ! to thee, who art the immutable and eternal Being. Let the mountains be shaken and change place ; let the sea be tossed about and make a noise ; let all earthly bodies return to their original dust ; still thou art, and wilt be invariably the SAME. Evermore thou shalt be my refuge, and thy grace shall be my consolation to eternity ! Probably I have but a short time to be a spectator of these revolutions. Should I be speedily removed, may I arrive in that happy place, where there shall be no vicissitudes of day and night, nor any variation of times and seasons ! There, in perfect and uninterrupted felicity, may I enjoy the light of thy countenance, and contemplate thy glories for evermore.

MAY IV.

AN INVITATION TO SEEK GOD IN THE WORKS OF NATURE.

AWAKE, O my soul, and arise from that profound sleep in which thou hast been so long immersed ; and regard, with attention, the objects which surround thee. Contemplate both thyself, and the other creatures : consider their origin, structure, form, utility, and a thousand circumstances, which should fill every attentive observer of the works of God with admiration. When thou lookest on heaven, its vivid and varied colours, the stars which disperse over it such a profusion of brilliancy, the light which discovers to thee surrounding objects, ask thyself, Whence do all these objects proceed ? Who has enamelled this immense arch of the heavens ? Who has placed in the firmament these innumerable fires, these stars, which, though at a prodigious distance, nevertheless dart their light down to us ? Who has ordered these planets to move with so much regularity ; and this sun to enlighten and fertilize the earth ? Is it not thou, O my adorable Creator ?—Yes, it is thy wise and powerful word, which has caused all these things *out of nothing*, and ordained them to continue in existence ! How great must thy power be, thy incomprehensible grandeur, O Lord my God, which has drawn these things out of the womb of nothing ; and how infinite must thy bounty be, which has arranged the whole in such a manner as to cause them to contribute to my felicity.

Lofty mountains ! what powerful hand has established your foundations ? Who has adorned your sides with forests, fruit-bearing trees, plants, and flowers ? Who has covered your summits with snow and ice ? Who has drawn from your bowels those rivers and fountains which moisten and fertilize the earth ? It is thy hand, O my Almighty Creator, which has wrought all these wonders ; and that divine hand I adore with sentiments of admiration, gratitude, and love.

Invitation to seek God in the works of nature.

Flowers of the field ! who has given you your magnificent dress ? How is it that you could be produced out of a small portion of earth, and a few drops of water ? Whence these different odours which embalm the air, and delight us ? Those vivid tints with which our eyes are so pleased, and which the art of man cannot imitate ? It is thy work, O my Creator : every thing on the surface of the earth proceeds from thee !

And you, O ye animated creatures, which people the air, the earth, and the waters ! to whom do ye owe your existence, your structure, and that marvellous diversity of instincts which astonish our reason, and which are so appropriate to your different modes of life ?—

But, what a multitude of miracles do I perceive, when I contemplate myself ! How is it that a handful of dust could become such an organized body ? How is it that one of these parts should see ? that a second, through the medium of the undulations of the air, should be able to know the thoughts of another ; and that a third should taste the different savours of aliments ? How is it that I should have the power to communicate to the creatures which resemble me the ideas and volitions of my own spirit ? How is it that a little earth, ground by my teeth, should produce so many agreeable sensations to my soul ? I acknowledge the hand of my Creator in all these incomprehensible miracles. Yes, my Lord, thy wisdom, power, and goodness, labour in concert to render me happy.

Infinite Being ! my most highly prized duty shall be to seek and acknowledge thee in all thy works. Is there a thing in the heavens, or upon the earth, that does not lead to thee, or call to my remembrance thy power, thy wisdom, and thy goodness ? The best use I can make of these beautiful days of spring is, in the midst of those revolutions which are now carrying on in the earth, to lift my eyes to thee, thou Parent of nature ; to thee, who in all seasons openest thy liberal hand, and satisfiest all creatures with thy bounty. And, as often as I recollect thy majesty, and thy beneficence, grant, *great God*, that I may praise thy name with transports of gratitude and joy ; and that I may exalt the miracles of thy wisdom. Henceforth may the most pleasing occupation of my life be to declare thy goodness to my brethren, and to sing of thy name before all thy people !

MAY V.

THE DAWN.

THE *dawn* discovers to the world a new and magnificent creation. The shadows of the night had deprived us of the sight and enjoyment of the heavens and the earth ; but that now the light begins to return, the eye discovers all nature vivified and embellished. At once we discover the earth in its magnificent dress : the mountains crowned

The dawn.

with forests ; the hills encircled with vines ; the fields covered with crops : and the meadows watered with rivulets.

The horizon begins to glow ; the clouds every where assume vivid and variegated colours : at a distance, the eye discovers smiling and flourishing vallies : the light vapours are converted into gold, and the drops of the dew, which cover the flowers, assume the pleasing brightness of pearls. In proportion as the light increases, the spectacle becomes more superb.—We proceed from one degree of light to another, till nature exhibits to us her noblest object.—The *SUN* rises ! The first ray has escaped over the tops of the mountains ! and has run rapidly from one side of the horizon to the other. New rays follow and strengthen the former : by degrees the whole disk of the sun is disengaged from the horizon : he arises complete, he advances in the heavens, and runs through his race with a majesty which the human eye cannot sustain.

Suppose one were in the country, and could see, from the top of a hill, this ravishing sight to which he had been before unaccustomed, what would he think ? What would he do ? Doubtless, filled with the sweet emotions of holy respect, he would prostrate himself, and adore that God who causes the *dawn* to spring forth. “Infinite Being !” he would exclaim, “in the brightness of the dawn I acknowledge thy power and wisdom. With the lark which mounts into the sky to salute the morning, the arrival of which she announces by the sweetness of her songs, I spring upwards to thee, O my God, who art the Father of creation. The harmony and joy of all nature, the revivification of all beings, invite *me* also to elevate my soul to thee, with the most lively transports of gratitude and joy. In this moment, while the sun is darting his first rays upon the earth, millions of creatures praise and adore thee. Can *I* then remain dumb, or be insensible, while discovering these wonders !—It is from *thee* that the beauty of the morning proceeds : from thee, who art the source of all light. It is thou who hast given it its beautiful colours : and who hast impressed the perception of them in the essence of our souls. Thou hast given me that spirit of a celestial nature, which can discover thee in all thy operations. Yes, my eye can see *thee* in the splendour of the morning :—if *thou* wert not, there could be neither sun, nor dawn of day, nor any creation. But I know thou existest from eternity to eternity ; and I rejoice that thou art my Father, as thou art the Author of the morning.”

But how much are those indolent men to be pitied, who never afford themselves the pleasure of contemplating the dawn. O had they but resolution enough to give themselves up to the pure and delicious joy which this magnificent view of nature is calculated to inspire ! O that they could but feel that the aspect of beauteous nature can fill the heart with holy joy, and with profound veneration for the Creator ! O that they would at last understand, that one thought excited in the soul at the view of the *dawn*, might become the happy

commencement of a Christian life, and eternally recompense them for a few hours which they had snatched from unnecessary sleep.

Let us deprive ourselves, sometimes at least, of our morning repose, to procure ourselves the satisfaction of contemplating the rising sun. We have lost much pleasure, if we have not yet seen the dawn ; or if, at its appearance, we have not been led to adore our Creator.

MAY VI.

THE WONDERS OF VISION.

THAT we might be able to perceive external objects, it is necessary that a number of rays should proceed from them, and fall upon our eyes. These rays, which enter the eye, pass through the *cornea*, where they are refracted, and passing on the *crystalline humour*, they are still more so. After having been sufficiently refracted, and then reunited in their passage through the *vitreous humour*, they paint, on the *retina*, the images of external objects, and define them with the utmost clearness and precision. The *optic nerve*, which terminates in the *retina*, conveys these sensations to the soul, and excites in it perceptions and ideas conformed to the impressions which these exterior objects have made upon the brain.

What we have said concerning vision, shows it to be one of the principal wonders of human nature, and that it well deserves to be more particularly considered.

The images of exterior objects are painted in an *inverted* form upon the *retina* : nevertheless, we see every thing *upright*, and in its true situation. How is it that the *greatest* objects are delineated in your eye in extreme miniature ; and yet we perceive every thing in its real size ? How does it happen, that when from the top of a tower we perceive many thousands of houses below us, in a large city, that each is painted so exactly in our eye, on a surface scarcely three times as large as the head of an ordinary pin ? So many millions of rays coming through a small aperture, are reunited in the *retina* which covers the bottom of the eye, without the least confusion, though they preserve among themselves the same order with the parts of the objects from which they proceeded. Again ; let a person from the top of a lofty mast view a fleet in the open sea, when all the sails of each ship are set ; let him view the sea itself : how many thousands of waves does he discover ! Now each of these reflect an immensity of rays upon the eye, which, notwithstanding its smallness, distinctly receives the whole.

Finally, let a person go to the top of a mountain in a clear day, and let him view the country for several miles round. Every tree, every blade of grass, sends rays of light to the eyes, without which

The wonders of vision.

it would be impossible for us to discover that continued green colour which we see in every part of the landscape below us. But, is it not still more astonishing, that we do not see the objects double; and that, having *two* eyes, each object appears to us *single*!

But here is another subject for admiration. These objects which we see are not only visible to *us*. We have already been astonished at the number of rays which they send to such a small space as the pupil of the eye. But they send as many to every similar quantum of space in the whole surrounding atmosphere; it is because of this that whithersoever we walk, new rays replace the former, and render the same object visible which we discovered previous to our changing our place. All these rays are already in existence, and only wait to be received by our eyes: but all the rays of light are not alike efficacious; besides those already mentioned, there are others beyond calculation, which, being much weaker, are effaced by the splendour of the first; but which are nevertheless ready to perform the functions of the former, when necessity requires. If we pierce a leaf of paper with a pin, and look through the hole, which is much less than the pupil of the eye, we, notwithstanding, discover the same objects, though they may appear to us much smaller.

But who properly reflects on this subject? The habit of discerning objects as often as we open our eyes, causes us to consider this operation as a thing exceedingly simple, and easy to be comprehended. Yet we are very far from being able to explain the manner in which we see these objects. We know that images are formed on the *retina*, and we know also that all the parts of the eye contribute to their formation: but this is not sufficient; for the eye can have no conception of what passes in itself: it is necessary therefore, that the impressions which these rays make upon the eye should be propagated to the brain; and for this purpose, the rays of light paint the image of the objects upon the *retina*, which is a tissue of nerves which have their origin in the brain: but we cannot possibly describe what passes there, because we have no perfect knowledge either of the nature of the brain, or the use of its different parts.

After all, we understand enough to cause us to acknowledge the greatness of the Divine wisdom, power, and goodness. What remains inscrutable to our understanding, is the work of a sovereign intelligence, which manifests itself every where, as well within as without us; and which is always accompanied with a goodness which is without bounds. O my God! may my soul incessantly acknowledge thy gracious wisdom! and may my lips declare the wonders of thy power; wonders which, though they surpass my conception, are to me ever advantageous and salutary!

Spring renews the face of the earth.

MAY VII.

SPRING RENEWS THE FACE OF THE EARTH.

WHAT an astonishing revolution takes place in every part of nature ! And how great is the goodness of that Supreme Being, who causes the seasons to succeed each other with so much order and regularity ! Our earth, which rested during the winter, re-assumes its verdure and fertility ; all the creation becomes reanimated, and seems to feel joy and gladness. But a few months since, the whole surface of the earth was a barren desert : the vallies, the appearance of which please us so much now, were then buried under a deep snow. The mountains, whose gray tops we now see elevated above the clouds, were then covered with snow and ice, and enveloped with an impenetrable fog. In those verdant avenues, where the nightingale at present dwells, nothing was to be seen but withered branches, *utterly* destitute of leaves. The brooks and rivulets which now run murmuring along, were arrested in their course by ice, which rendered them immoveable. The birds, which fill the air with their songs, were then benumbed in caves and marshes, or were obliged to depart to other climes. A mournful silence reigned every where : and as far as the eye could extend its sight, nothing could be discovered but a melancholy solitude.

But as soon as the breath of the Most High has been felt, nature arose from her stupor, and life, thanksgiving, and joy, are now diffused through all its parts. The sun seems to approach our globe, and already the atmosphere is penetrated with his vivifying warmth ; the whole vegetable kingdom feels the beneficent influence ; the earth produces grass, flowers, and herbs of every kind. Now, the whole form of the earth is renewed and embellished. At the sight of this blessed revolution, should I not employ myself in meditating on that glorious Being who has wrought this change !—"Lord thou visitest the earth, and the vallies assume a smiling appearance. Thou waterest them with thy dew to enrich them, and the fountains whence thou waterest them are always abundant. Our crops ripen at thy command, and fill our hearts with joy. Thy blessing rests upon our furrows ; and thy rains refresh the thirsty land. Thou dost saturate and bless its germs : thou crownest the year with thy kindness ; thy word renders the earth fruitful ; flowers and fruits spring up under thy footsteps : blessedness and fertility follow thee.—The pastures of the desert are watered, and the hills are adorned before us in smiling verdure. The country is covered with flocks, and the vallies are filled with corn ; they resound in all directions with shouts of joy, and songs of gladness. The praises and thanksgivings of universal nature, mount up even to the heavens."

In this revolution which the spring produces, I see an expressive image of that salutary change which a soul feels that no longer resists the operation of the Divine Spirit. Previous to this it had no

Spring renews the face of the earth.

real beauty : its faculties were depraved and disordered, and it was wholly incapable of producing the fruits of piety. But how happy is its state since it has felt the sweet influences of the grace of God ! It is at present like the earth, which has experienced the influence of the vernal sun. Ignorance is dissipated, vanity and vice disappear, evil passions are subdued, the heart is filled with holy and religious sentiments, the fruits of which tend to delight and edify the children of men.

O how happy should I be if this spring of nature might become the epoch of a renovation as salutary to me. Should *I* be the only creature in the universe which manifests neither life, grace, nor growth ? Shall I still continue barren and dead, whilst an universal fecundity is extended over the face of the earth ? No, I desire to become a new man ; and by the assistance of thy grace, O my God, I will apply myself to produce those fruits of righteousness and true holiness which shall be as pleasing in thy eyes as they are useful to mankind.

MAY VIII.

THE GERMINATION OF SEEDS.

MANY changes are now made in the vegetable kingdom under our immediate inspection. But there are many more which escape our observation, and which nature operates in secret. The seed which was deposited some time ago in the earth, swells, enlarges, and the plant bursts forth, and gradually shoots up. This operation merits our attention the more, because it is the source of all the beauties which spring and summer present in the vegetable world.

The seed is composed of different parts according to its various species, but its principal is the *germ*. Every germ has two parts : the one simple, which becomes the root ; the other laminated, which becomes the stalk and head of the plant. The body of most kinds of grain is composed of two pieces, which are called *lobes* ; these are filled with the farinaceous matter, and they serve for seminal leaves to the plant. *Mosses* have the most simple seed : it consists only of the *germ*, without *pellicle*, and without *lobes*. To cause the grain to bud, air, and a certain degree of humidity and warmth, are absolutely necessary. The augmentation of heat, and the difference which may be remarked in the taste and smell, seem to discover a certain fermentation. By means of this preparation, the farinaceous substance of the *lobes* becomes proper to nourish the tender germ.

We know by experiments which have been made with coloured juices, that this substance imbibes a moisture which furnishes a proper nourishment, in union with the air and heat, till the little plant has acquired strength enough to profit by the juice which the root imbibes. Then the exhausted lobes dry by little and little, and fall

Germination of seeds.

off of themselves at the end of a few weeks, when the plant has no further need of their succour. Certain herbs which grow on the mountains, are of a very particular nature. As their duration is very short, it often happens that the seed has not time to ripen: that the species may not perish; the *button*, which contains the germ, is formed on the top of the plant, puts forth leaves, falls, and takes root.

When the little plant shoots up from the earth, it would run great risks, were it to be immediately exposed to the external air, and the action of the sun. Its parts therefore remain folded, lying close to each other, nearly as they were in the seed. But in proportion as the root grows strong and extends on all sides, it furnishes the superior vessels with an abundance of juice, by means of which all the organs speedily unfold themselves. At first the plant is almost gelatinous, but it gradually acquires more consistence, and continually increases in size.

This epitome of the history of the germination of grain, may suffice to show us how many preparations and means nature uses to produce a single plant. When we see a seed bud, which we have put in the earth, we must not imagine, as is ordinarily the case, that this is a thing which merits little of our attention. It is one of the wonders of nature which has been the subject of the meditations of some of the greatest men. At the sight of this phenomenon, let us silently admire the power and wisdom of God, which are adorable in all things. Even the order in which plants succeed each other so regularly is a proof of that wisdom which manifests itself even in the smallest things.

Here I should reflect on my moral nature: it also contains a certain germ, which grows up with time, increases, and bears fruit. In the view of my Creator, this should be a mean of leading me to felicity; but my natural corruption, and the circumstances in which I am found, often counteract these merciful intentions.

MAY IX.

THE CHICK IN THE EGG.

WE are under the greatest obligations to naturalists, who have taken the trouble to make those inquiries into the generation and propagation of animals, which have cast the greatest light upon this subject. Nothing can contribute more to the glory of the Creator, than the observations which are made on the wisdom that manifests itself in the production of animal creation. The less we find ourselves capable of understanding the whole of his works, the more earnestly we should seize the opportunities which present themselves to us, to inquire into some of them. It is with this view I wish to excite my

 The chick in the egg.

reader to admire the wisdom of God, which may be particularly seen in the formation of the chick in the egg, according to the observations of the most accurate naturalists.

Scarcely has the hen sat on the egg *twelve hours*, when some lineaments of the head and body of the embryo chick may be discovered. At the end of the second day the heart begins to beat : at this time, it has the form of a horseshoe : but the blood is not yet to be seen. At the end of *forty-eight hours*, we may discern two vesicles with blood, the pulsation of which is very evident. One is the left ventricle ; the other is the root of the great artery. About the *fiftieth hour*, we may discover one of the auricles of the heart, which resembles a lace folded back on itself. The pulsation of the heart may be now remarked in the auricle, and afterward in the ventricle. At the *seventieth hour* we distinguish the wings ; and on the head, two knobs for the brain, one for the beak, and two others for the back and fore side of the head. Towards the end of the *fourth day*, two auricles, now distinctly visible, approach nearer to the heart than they did before.

The auricle which was first seen appeared to have two horns, but these are now found to have been the two auricles. About the *fifth day* the liver is seen. At the end of *131 hours*, the first voluntary motion is perceived. At the close of *138 hours*, the lungs and stomach become visible ; and at the conclusion of *142 hours*, the intestines, the reins, and the upper jaw may be seen. In *144 hours*, we see two ventricles, and two drops of blood, instead of the one which was seen at first. The *seventh day* the brain, which was mucilaginous, begins to assume some consistence. After *190 hours* of incubation, the beak opens, and the flesh appears on the breast. At the *194th hour*, the sternum, i. e. the breast-bone, may be seen.

About the *210th hour*, the ribs come out of the back, the beak is very visible, and so is the gall-bladder. The bile becomes green, after the *236th hour*, and if the chick be taken from its integuments, it may be seen very plainly to move itself. The feathers begin to shoot towards the *240th hour*, and the scull becomes cartilaginous. At the *264th hour*, the eyes appear : at the *288th*, the ribs are perfected : and at the *331st*, the spleen approaches the stomach ; and the lungs the breast. At the *355th hour* the bill often opens and shuts. At the close of *451 hours*, or the *18th day* of incubation, the first piping of the chick is heard. Afterward it continually increases in strength and size ; till at length it sets itself at liberty, by breaking the prison in which it has been confined.

How adorable is the wisdom of God, which, by so many different gradations, conducts these creatures into life. There is not one of these progressions but what is done according to order, and each carries with it its own reason. If, for example, the liver is always formed at the end of the *fifth day*, this is founded on the preceding state of the chick ; and on those revolutions which must afterward take place. No part of its body could appear sooner or

The chick in the egg.

later without being an injury to the whole embryo ; for each of its members become visible in that moment which is the most proper. This order, so wise and so invariable in the production of this animated body, is manifestly the work of a Superior Intelligence : but we shall acknowledge still more perfectly the creative virtue of God, if we consider, in the aggregate, the manner in which the chick is formed out of the parts of the egg.

How marvellous is it, that we find in an egg the vital principle of an animated being, and that all the parts of the animal body are there hidden, and that warmth only is wanting to vivify them : that the whole formation of a chick is brought about in such an established and regular order, that exactly in the same time, the same revolutions takes place in twenty eggs, or as many as can be covered by a hen ! That the position of the egg being altered, or its being changed from one place to another, does not at all injure the *foetus*, nor hinder its formation : and that the chick on the moment of its bursting the shell, is found to be heavier than the whole egg was at first !

But these are not all the wonders manifested in the formation of a chick. The microscope and the scrutinizing spirit of man, have discovered only those which fall more immediately under the observation of our senses. But the discovery of many things may be reserved for those who shall follow us ; or be perfectly known only in the world to come ! Many questions might be asked, especially on this mystery of generation, questions which the human spirit cannot resolve here below. But let not this ignorance discourage us. Let us only think how we may make a good use of our little stock of knowledge, and employ it to admire and celebrate the wisdom, power, and goodness of our Creator.

MAY X.

ON THE BUDS OF FLOWERS.

ON all sides I discover a multitude of flowers in bud. At present they are still enveloped, and closely shut up in their covers. All their beauties are hidden, and their charms veiled.—Such is the wretched miser, who is insulated and concentrated in himself ; whose views are low and interested : who refers all to himself : and who makes his private advantage, or personal pleasure, the centre of his desires, and the confined circle of his actions.

But soon the penetrating rays of the sun shall open the buds of the flowers, deliver them from their silken bonds, and enable them to spread themselves magnificently before our eyes. With what a pleasing ruddiness will they then appear ! what delicious perfumes will they then exhale !—In like manner, the most sordid miser will become beneficent as soon as divine grace shall shine upon his soul. A heart of flesh shall succeed a heart of stone : a feeling and sympa-

On the buds of flowers.

thetic heart, capable of the sweetest and tenderest emotions. By the benign influence of the Sun of Righteousness, the social affections shall unfold themselves, and spread more and more. Cordial tenderness shall then no longer be concentrated on one object, but shall become universal, shall embrace all men, shall extend its generous cares to the utmost distance, and cheer all that are within its reach.

When I consider the buds of flowers, I think of you, ye amiable and gentle *youth* of both sexes. The beauty and energy of your souls are not yet developed: your faculties are in a great measure yet hidden, the hope which your parents and masters entertain of you, cannot be soon realized. When you walk with your parents in the country or in the gardens, consider the buds of flowers, and say to yourselves; "I resemble this bud, my parents and instructors expect the unfolding of my talents and faculties. They do every thing for me: they neglect nothing to form and instruct me: they watch with the most tender care over my education, that first by blossoms, and then by exquisite fruits, I may be their joy and consolation, and render myself useful to society. I must do every thing in my power to gratify the pleasing hopes which they conceive of me. May I profit by the cultivation they bestow on me, and by all the instructions they give, that I may daily become more wise, amiable, and pious! To this end, I must take care not to give up my heart to those youthful desires and passions which may become mortal to my innocence, and destroy all the pleasing hopes which they have formed concerning me.

"In the morning of my life I flourish as the bud which opens insensibly. My heart beats with joy, indulges the most pleasing hopes, and looks forward to nothing but a blessed futurity. But should I be so imprudent as to give admission to foolish desires, and to the false sweets of pleasure, my youthful heart would soon be dried up and blasted by these sinful flames."

MAY XI.

THE INDEFATIGABLE LABOURS OF THE BEE.

ONE of the advantages of the spring is, that it gives an opportunity of observing the labours and industry of bees. And certainly the sight of a hive is one of the most beautiful sights which an admirer of nature can behold. A certain grandeur prevails in it which is astonishing. How interesting is that laboratory, where thousands of workmen are employed in different ways. We proceed from astonishment to astonishment in beholding the regularity of their labours, and especially those magazines so abundantly furnished with all that is necessary for the subsistence of the society during winter. But that which merits our attention most is the indefatigable assiduity, and uninterrupted labours of this little republic.

Indefatigable labours of the bee.

Bees give us an example of diligence and activity, which is not only uncommon, but which has, probably, never had its equal.

They begin to show themselves as soon as the winter is past ; even while there is room to suspect that the cold may injure them, and benumb their tender limbs. When the juices of flowers, which begin to spread, have not as yet been sufficiently concocted by the heat of the sun to furnish honey in abundance, the bees, however, do not fail to collect a little for their subsistence. But their cares and activity are evidently redoubled during the spring and summer. In these seasons they are never idle. They do all that they can, and do not disdain the smallest profits, provided they may increase their stores only a little. In the construction of their cells, they are so indefatigable, that we are assured, that a comb with double cells set back to back, is finished in twenty-four hours, so that 3000 bees lodge in them !

All the work is divided between the members of this republic. While some collect, prepare, and fill the magazines with the wax, others are occupied in different labours. Some take the wax, and build their cells with it ; others knead it, polish, and perfect the work : others collect the honey from the flowers, and lay it up in the hive for daily nourishment and future support : and others seal up the mouths of the cells with a covering of wax, in which they have stored up their winter's provision of honey. Some carry nourishment to the young ones, and shut up the habitation of those small worms with wax, which are near their metamorphosis, to the end that they may work more quietly. Some stop up with a glutinous substance all the clefts and openings of the hive, and plaster over all the weak places, to the end that neither the wind nor insects may find an entrance. Some drag the dead out of the hives, for fear of infection ; or if these bodies be too heavy, they coat them over with a gummy substance or wax ; and cement it, so that while they corrupt under that crust, no bad effluvia may be exhaled.

But it is not enough to admire the activity of these little creatures—we should emulate them : and attending to the proportions between them and ourselves, use them as our models. We have many more motives to diligence than these insects have. We have a soul of inestimable worth, which will endure for ever. With what application should we labour to become happy, and to shun whatever might lead to total ruin ! What more capable of exciting us to indefatigable diligence and activity, than to think that the fruit of our labour is not to extend merely to a few days or years, but to eternity ! The bee collects honey, not for herself, but for her owners : but in attaching ourselves to wisdom, we labour for *ourselves* alone, and gather fruit for eternal life.

Let us never be backward to do good ; but let us acquit ourselves of the duties of our vocation, with all the zeal and fidelity in our power. Let us accomplish, without delay, the task imposed upon us, and work while it is called to-day, for the night cometh wherein no

Indefatigable labours of the bee.

man can work. Let us show forth the same diligence to the full assurance of hope unto the end, that we may be followers of them, who, through faith and patience, inherit the promises. *Heb. vi. 11, 12.* And let us attend to this the more particularly, because the winter of sickness and old age approaches ; and before death has for ever decided our lot.

“ O man ! go to the school of the bee ; consider that wise labourer, and contemplate her works. Admire her activity and industry, by which she turns all to her advantage. Always busy, ever indefatigable, evening and morning she labours, and supports with courage the troubles of a short life. And wilt thou languish in indolence and idleness, or consume thy days in frivolous pleasures ? Ah, rather apply thyself to more earnest labour than even the bee, which has not received, like thee, the inestimable gift of reason. Thy life is short : may it be entirely consecrated to labour, without intermission, for the glory of thy great Master, and the welfare of thy soul ! The time which the Creator has given thee, should not be consumed in effeminacy and inaction. Thou hast received from his liberal hand, life, reason, and strength. Sanctify them by the love of labour ; and let thy tender years, thy manhood, and thy old age, be consecrated to the service and glory of thy God.”

MAY XII.

HOW GOD HAS PROVIDED FOR THE NOURISHMENT OF ANIMALS.

FROM the *elephant* to the *mite*, there is no terrestrial animal that can live without food and nourishment. From the *eagle* to the *gnat*, there is no flying creature that can exist without it. From the *leviathan* to the smallest *worm*, there is no reptile which can subsist without eating. From the *whale* to the *oyster*, there is nothing in the waters to which nourishment is not necessary. But, in forming these creatures, so that they have all need of food, God has provided, at the same time, such an abundance and diversity of aliment, that every creature may receive that nourishment which is most proper for its subsistence. As many different species of animals as there are, so many different kinds of food are destined for their support : so that there is not a creature found upon the earth which has not got that food which is suitable to its nature.

In respect to this, we may divide animals into *three* principal classes. The *first* includes all those who live on the flesh of others ; some of these, as the *lion*, like *quadrupeds* only ; others, *fowls*, as the *polecat* ; others, *fish*, as the *beaver* ; and others, *insects*, as different kinds of *birds*. In these, however, there are many exceptions ; but in general it is certain, that every species has suitable aliments, which the great Creator has destined for it.

The *second* principal class includes those animals which seek their nourishment in the vegetable kingdom. Almost every species of

How God has provided for animals.

plants is the peculiar food of some particular animal. Some prefer grass, others the fruit of trees. Even among those who like the same plant, a remarkable difference is found. Some only take the *root*; others the *leaves*; some the *stalk*; others the *pith*, *seed*, or the *whole fruit*; and some are found who eat the *whole plant*.

The *third* principal class includes those animals which are nourished by the *mineral kingdom*. The greater part of these are *insects*; and on this account it is difficult to determine what the aliments are which are suitable to each species in particular; for these animals being so small, they are not so easily observed as others. It is known however, that some live in earth, others in stones. And if we consider, that there is scarcely any plant, or animal, which does not serve for nourishment to some other animals; we shall find no difficulty in supposing that it may be the same in the mineral kingdom, in which there is nothing found which does not serve, directly or indirectly, for nourishment to some insects.

We may now understand these words of David: All creatures look unto thee, and thou givest them their meat in due season. Thou openest thy hand, and satisfiest all things with that which they desire. *Psa.* cxlv. 15, 16. These cares of Divine Providence, are a very sensible proof of that eternal goodness which is extended over the universe. Let us reflect on the prodigious number of animals which exist. How many thousand *genera* of insects and birds, and how many hundreds of thousands in each *genus*! All these creatures find daily support. How many thousands of terrestrial animals live on all parts of the globe! How many hundreds of thousands find lodging and food in the forests, in the fields, on the mountains, and in the valleys; in the caverns, and in holes of the rocks; upon, and in trees, in clods of earth, and in stones!—What innumerable hosts inhabit the ocean!—What immense shoals of fish swim in seas, rivers, and brooks! All these creatures find daily means of support. What an inexpressible multitude, what an astonishing diversity of insects encompass us every where! What millions of millions! Insects in the air, in plants, on animals, in stones, and upon other insects! Each finds continually its daily food. But how amazing is the wisdom of the Creator, in the manner in which he nourishes these animals? He gives to each that food which is most suitable to its nature. Every kind of food cannot agree with all. There is one sort for quadrupeds, another sort for fowls, another for fishes, and another for insects. This distribution of aliments is a mean very wisely ordained by the Creator, not only for the effectual support of every species of animals, but that no species of food which the earth brings forth may be useless, but that her whole produce may be exactly consumed.

Now if God take such care of animals destitute of reason, what will he not do for men? This is the inference which the reader may and ought to draw from observing the arrangement which the Divine Providence has made to give all the creatures of the earth the things necessary for their support. O thou of little faith! Thou who art impatient.

How God has provided for animals.

anxiously careful and discontented, go and consider with what goodness the Lord has provided for the life of animals ; and let this teach *thee* to be contented, and to trust in God. “ See the fowls of the air, the wild beasts in the rocks and caves of the earth, the fish in the sea, and the different animals of the fields and the forests ; all find sufficient nourishment ; all find a convenient habitation. Great in little things as in great ones, God has not disdained nor neglected the smallest worm ! Can it then be possible, that MAN should be the only creature that is not the object of his paternal care ! ”

MAY XIII.

THE SENSES OF ANIMALS.

IN all animals, the organs of sense are arranged in such a manner as is conformable to their nature and destination. By these they are enabled to acquaint themselves with objects whether at hand or at a distance : by these they are enabled to provide for their necessities : and by these they avoid the dangers to which they are exposed.

That sense, by which animals can form an idea of corporeal objects, as soon as they touch them, is termed *feeling*. In beasts, as well as men, this sense is situated in the outward skin, which is covered with the extremities of a multitude of nerves. We cannot positively determine what revolutions feeling experiences in the greater part of beasts : we know not whether insects be not endowed with another sense, and whether their *antennæ* be not the organs of a sense entirely unknown to man. Birds, fishes, serpents, and some other animals, appear to have no feeling.

The organs of *taste*, are chiefly the *tongue* and the *palate*, which receive the impressions of savours : but the *papillæ* of the nerves are the immediate instruments in this case, as they are in that of *feeling* : and between those two senses there is a great analogy.

Smelling has for its organ the membrane which lines the inside of the nose. It is by means of the ramifications of the nerves, which are spread on this membrane, that we perceive those odoriferous vapours which float in the air. Animals, which require a more delicate and subtile smell, are endowed with a greater perfection of this organ. Worms appear to be entirely deprived of it : and probably fish and insects also : but it is possible, that the *antennæ* of the latter may be the organs of smelling. By means of this sense, beasts find whatever is necessary to the preservation of their lives ; birds and reptiles their nourishment : and many animals, through this, are apprized of the approach of their enemies.

By *hearing*, animals become sensible of the tremours and vibrations of the air. The structure of the ear is not the same in all beasts. Some, as the lizard, have two tympanums. Others are deprived of several of the instruments of hearing, which are common to the major part of animals. It is supposed that birds and fish are destitute of

The senses of animals.

that part, which is called the *meatus auditorius*, and that worms and insects are absolutely deaf.

The eyes are the organs of *sight*. Except the *cuttle-fish*, the *hedgehog*, and perhaps a few others, all reptiles are without eyes. Quadrupeds, fowls, fish, and amphibious animals, have all two eyes, one on each side of the head. On the contrary, insects have in general, more than *two*. The spider and scorpion have *eight*. The greater part of the others have them by *thousands*, commonly collected in two orbits. A *fly* has 16,000 eyes: a *beetle* 6362: *butterflies* 34,650! The number and situation of these eyes compensate insects for their incapacity of moving or turning them. Fish have nothing of the *aqueous humour*; but their *crystalline* is almost entirely globular.

All the organs of sense are manifestly disposed in such a manner as is conformable not only to the structure of the bodies of animals, but also to their different necessities. To be convinced of this, we need make but a small number of observations. As the eyes of the greater part of insects are immoveable; and in consequence useless in many cases, nature, to supply this defect, has given them *antennæ*, by which they can discern whatever would be injurious to them, and what might escape their sight. The eyes of fishes are disposed with the same wisdom. A prominent eye would not be convenient for them: therefore, their *cornea* is perfectly flat: but to remedy the defect of a *flat* cornea, the Creator has given them a *crystalline* perfectly round. In animals which live in the open air, it is *lenticular*, and consequently more flat. Although the figure of eyes in general be round; yet even in this roundness, great diversity may be remarked. Their situation in the head is infinitely varied, according to the destination and necessities of the animal. In man, who sees little but what is before him, the eye is situated in the fore part of the head; and is so constructed, that it can receive impressions from the whole semicircle of objects before him. In birds, the eye is so situated, that it can admit almost the whole sphere of objects which encompass it; by this these animals are enabled the better to seek their nourishment, and to shun the dangers to which they are exposed.

The *ear* of man has that figure which corresponds best to his upright posture: in birds its posture is the most proper for flight: it does not project, for this would be an obstacle to their progressive motion; but it is close and covered, that they may have a freer passage through the air.

What wisdom, what economy, what admirable art in the arrangement and in the disposition of the senses in animals! But probably we know but the smallest part of this admirable mechanism. And doubtless the greater part of our observations in this respect, merit less the epithet of discoveries, than that of probable conjectures. If we could get a more perfect knowledge of the internal structure and use of the senses in animals, we should still have more cause to admire the wisdom of God: let us employ at least the little we do know to celebrate and glorify our common Creator.

The more imperfect our knowledge of animals is, the more we should avoid treating them with indifference or contempt. Let us rather consider them as a mirror of the wisdom and power of God; for animals themselves may furnish us with incontestable proofs that the Lord has made them, as well as he has made us: and that he is great in counsels, and abundant in means.

MAY XIV.

REGULARITY IN THE SUCCESSION OF FLOWERS.

EVERY plant appears upon earth in the order prescribed to it. The Creator has exactly determined the times when one is to unfold its leaves, another to flower, and a third to die away. Several weeks ago you have seen the *snowdrop* spring from the earth. A long time before the trees ventured to unfold their leaves, and while even the earth was covered with snow and ice, it ventured to show itself: and of all the plants it was the first, and the only one, which charmed the eyes of the naturalist. Afterward the *crocus* appeared, but timidly, because it was too weak to bear the impetuosity of the winds. With it, the lovely *violet*, and the *auricula* (so much esteemed for the brilliancy of its colours, and the varieties of its species,) showed themselves. All these plants, and some others which appeared upon the mountains, formed the advanced guard of the army of flowers. And their arrival, so pleasing in itself, had the further merit of proclaiming the speedy approach of the multitude of flowers.

Now we see the other children of nature present themselves; not all at once, but in successive order. Every month exhibits the ornaments which are peculiar to itself. The *tulip* begins to develope its leaves and flowers. Speedily the beautiful *anemony* will form its full round dome. The *ranunculus* will expand all the magnificence of its leaves, and charm our eyes by the most agreeable mixture of colours. And, to crown this amiable troop of flowers, the *rose* shall open and spread abroad all the charms which distinguish it: and the *pink* will appear with all those graces which give it such a superiority over its companions.

Let us stop here and reflect on the views of the wisdom and beneficence which are manifested in this succession of flowers. If they flourished all at once, we should at one time feel an excessive abundance, at another, a total want. We should be so soon deprived of them that we should not have time to admire the half of their beauties. But when every species has its determined place and time, we can, in this agreeable succession, contemplate them more conveniently, and with more exactness. We can examine them more than once, enjoy their charms at our leisure, and gain a more extensive knowledge of them. This kind and wise attention of Providence procures another very precious advantage. It does not offer us merely

 Regularity in the succession of flowers.

each species of flowers in all its beauty ; but it remedies, in some sort, the transitoriness of these amiable productions of nature ; for though there are always some flowers fading, yet new ones are continually rising in our gardens to afford us uninterrupted pleasure.

What goodness in the Creator, thus to favour the human race with a constant succession of benefits ! What goodness, not only to set no bounds to the multiplying of his favours, but thus to render them constant and durable ! He literally conducts us by a flowery path, wheresoever we go flowers spring up under our feet, and the appearance and enjoyment of them may sooth and comfort the pilgrimage of life.

In the same order in which flowers succeed each other, so does the human race. Every man appears in the world in that place which the infinitely wise Being has assigned him. Each is born in the time which God has chosen for him to exist in.

From the beginning of the world, the generations of men succeed each other on this great theatre, each in its order, in that time, and in that place, which the Creator has determined.

The moment that children are born others return unto dust. While one is preparing to render himself useful to the world, another has finished his business upon earth. Who knows when his turn shall come ? May I at least, when I leave the earth, retire as honourably as the *tulip* or the *rose*, which have diffused so much pleasure and gratification through the narrow circle in which they were planted.

Finally, I should not disquiet myself, nor lose courage, when I see the righteous depart from this life. Providence knows well how to replace *them* ; as, when the flowers of spring are faded, it never fails to grant a succession of new plants.

 MAY XV.

THE ZOOPHITES.

THE zoophites, or plant animals, are nothing but insects ; but by reason of their external configuration, their fixedness to one place, and their producing themselves by buds and seeds, they very much resemble real plants. These animals, as well as plants, may be multiplied by *grafts* and *slips*. Their animal nature is only known by their sensibility and their voluntary motion. The greater part of zoophites are attached by a kind of root to the sea ; or to the waters in which they live. Many grow in stony and chalky places ; others are surrounded with a shell, which resembles horn, and others are soft and fleshy. This they all have in common, that without any preceding connexion, new zoophites proceed from the surface of their bodies. As long as these young animals are attached to the stalk, they form with it but one animal : they are nourished by it, and nourish it in their turn : but as soon as they are detached from the stem, they have a proper existence by themselves.

The zoophites.

Zoophites multiply themselves in a way which very much resembles the generations of plants. They form a species of germ, which contains a young animal, which grows for some time on the stalk ; and at last falls off, and becomes a perfect animal. Could we ever have imagined that there were animals which resemble plants, and are produced like them ? From the ideas which are generally formed of animal existence, could we have ever supposed that the brain, heart, stomach, and all the intestines necessary to life, could be produced anew ? Could we have ever supposed that an animal could exist, which had neither brain, heart, veins, nor arteries ; which, from the top to the opposite end of its body, is but one hollow tube ; which appears to be all stomach, all intestine ; and whose arms and legs are stomachs and intestines ? Could we have ever thought of an animal that could be engrafted like a plum-tree ; turned inside out like a glove ; and which produces its young as buds from branches ? Half a century ago, the person who would have hazarded such ideas would have passed for a madman. Nevertheless, it is incontestable at present, that there are such animals which not only in their outward form resemble plants, but also in their manner of perpetuating themselves.

By this discovery, made in the beginning of the last century, natural history has been a great gainer. We may even venture to say, that our ideas of the power of God are more extensive. Since the zoophites have been discovered, we have a new proof that God has distinguished his different works by very narrow limits ; and that it is also impossible to determine where the vegetable kingdom ends, and the animal kingdom begins. It is commonly believed, that the difference between plants and animals consists in this, that the former have neither sense nor motion ; and that the latter both feel and move. This, no doubt, is the distinguishing characteristic between plants and animals : but how weak are the distinguishing shades, how almost imperceptible the line that separates the two kingdoms, when we reflect on the discovery of the zoophites ! The different species of creatures are produced, grow up to perfection, and approach to one another in such a way, that the limits which distinguish them cannot be ascertained. Every where nature gives us a glimpse of that *infinity*, which is the proper character of its great Author !

Infinite Being ! who can conceive all the immense grandeur of thy empire ? Who can perfectly comprehend the fulness of any one part of this empire ? What wonders, which are now hidden, shall be discovered in successive ages ! But those which are now before us, are sufficient to convince us of thy infinite grandeur ! My employment shall henceforth be, to study and fathom more and more the wonders of thy government ; or at least, to make use of the little that I know of it to glorify thy great and holy name. But may I at last arrive in that blessed place, where I shall see thee as thou art, and perfectly understand the works of thy wisdom and goodness !

MAY XVI.

THE PLEASURES OF AGRICULTURE AND GARDENING.

THE cultivation of fields and gardens is one of the most agreeable occupations, and perhaps the only one, the toil of which is recompensed with a thousand pleasures. The greater part of laborious employments oblige men to shut themselves up in their chambers and in their workshops ; but he who labours in the fields, enjoys the pure and open air ; and breathes freely on the magnificent theatre of nature. The azure heaven is his canopy, and the earth, ornamented with flowers, is his carpet. The air which he breathes is not corrupted by the empoisoned exhalations common to cities. A thousand pleasing objects present themselves to his eyes ; and if he has any taste for the beauties of nature, he can never be destitute of pure and genuine pleasures.

When in the morning the light opens anew the brilliant scene of the creation, he hastes to go out and enjoy it in the fields or in his garden. The dawn announces to him the speedy approach of the sun. The green grass erects itself, and its points shine with drops of dew, which appear like diamonds, emeralds, and sapphires. The delicious odours which are exhaled from the herbs and flowers, perfume and delight him. The air around him resounds with the singing of birds, by which they express their joy, their love to each other, and their happiness. Their concerts are hymns of praise to the Creator, whose blessings they prove in the pleasing light and heat of the sun, in the savour of their food, in the sweet instincts of nature, and in their joy and cheerfulness ! Is it possible, that at the appearance of so many delightful and affecting objects, the heart should not be filled with joy, gratitude, and love to God ? Can a person who enjoys these, help loving, admiring, and being filled with veneration for his Maker ? Can the mind have a more pleasing employment than that of contemplating and celebrating the august perfections of God, the extensiveness of his views, and the beauty of his works ?

What contributes further to render agriculture and gardening singularly pleasing is, that an infinite diversity of objects, labours, and occupations attach us to the work, and thus prevent that disgust which is the inseparable companion of sameness. There is a great variety of plants, fruits, herbs, and trees, which present themselves to us under a multitude of different forms. Nature leads the labourer by the most varied paths, and presents him with a thousand pleasing changes. At one time, he perceives plants just springing from the earth ; and at another time he beholds others, which arise and expand themselves ; and others still which are in full bloom. On whatsoever side he turns himself, he beholds new objects. The heavens above his head, and the earth under his feet, contain inexhaustible treasures of pleasure and delight.

What agreeable hours must we pass, if in these beautiful days of spring we went to visit the fields and gardens, to taste those pure and innocent joys with which these objects are calculated to inspire our hearts. When we can, let us abandon the city, and the affairs which confine us there ; and go and contemplate the magnificence of God in the works of nature. At such times let us give ourselves up to the sweetest sentiments of gratitude and joy, and raise our souls in praise to our Creator ! O bless the Lord, consider his works, and seek him in each meadow, and in every operation of nature.

It is He who has fixed the return of the spring ; who has told the crops when they should fill the granaries of the just and the unjust with new sheaves.

O think on Him, when, in spring, the sweet breathing of the zephyrs, the image of his goodness, refreshes you in the air : when, in autumn, the branches of the trees bend down under the weight of his gifts.

He crowns the year with his blessings : he is the source of all good. The parched fields are watered by the rains which he sends, and by him the earth becomes fertile.

Praise the Lord ! Behold the forests, the rivers, the vallies—they discover to you the traces of his goodness. You may find him in the meadow and in the diversity of flowers by which it is ornamented. Every where you may meet with the Lord of the universe !

MAY XVII.

THE TULIP.

OF all flowers, the tulip has incontestably the finest form. No mercer can show stuffs which in the variety and splendour of the colours, or in the mixture of light and shade, can rival the perfection of this flower. The size of the tulip, its form, its colours, its masterly execution, make it the queen of flowers. And when we consider, that each year millions of tulips flourish, which are all different from each other ; and whose proportions and beauties are infinitely diversified, a person must have lost all sentiment not to be struck with admiration. To be convinced of the existence of a good God, we need only contemplate a tulip in full bloom. Is it possible that such a masterpiece of nature could be produced by blind chance, without the intervention of an intelligent cause ?

It is true, that tulips are produced and propagated by the bulbous roots : but whence came the first construction of this machine, and that primitive arrangement of which all the subsequent revolutions have been only the developement ? Must we not necessarily admit an intelligent cause, which we call the Creator ? It requires as much wisdom and power to create a tulip, from which ten others shall spring, as to create ten at once. For, the new ones must have neces-

The tulip.

sarily existed in those which have gone before ; and it is manifest, that their figure and their number must have been previously determined. When, therefore, we see a bed of tulips, we should not confine ourselves merely to admire their beauty ; but we should especially admire the infinite wisdom of God, who has sketched the outlines of these flowers, and executed the work with so much perfection.

Whatever the beauties of the tulip may be, they lose a little of their value when we consider they are only to please the sight ; for this flower is not odoriferous. As soon as we place the pink beside it, which unites with the beauty of its form the most exquisite perfume, we forget immediately the variegated drapery of the tulip. This is the case of those persons, who, endowed with the charms of beauty, set them off with intrinsic ornaments ; but who have neither a good understanding, nor a good heart. But is it not much more advantageous to have fewer external ornaments, and an amiable disposition ? The former captivate only for a time ; but the beauty of the mind remains, when all the charms of the form have disappeared ; for the esteem which virtue inspires is durable and permanent. A virtuous mind is pleasing both to God and man. It is formed after the rules of Wisdom : and its decoration is innocence. The odour of good works diffuses itself wherever it dwells ; and he who emits this, shall be shortly transplanted into the garden of Paradise.

One observation which the history of plants furnishes, is, *that the more beautiful a flower is, the sooner it fades*. In a short time, there will be no more of this beautiful tulip than a dry and dead stalk. Its beauty, and its life, last only a few weeks : age destroys its charms, its leaf withers, its colours fade, and the tulip which lately resembled a beautiful virgin, is now only a deformed skeleton. What a useful lesson is this for us ! How little should we depend on external advantages ! How frail and transitory is the beauty of the body ! How near is the approach of death ! For what is our life, but the life of a flower ? Those who resemble it in their beauty, resemble it also in the short duration of their lives. For man who is born of a woman, has but few days, and full of trouble ! he grows up and flourishes as a flower, and speedily withers away. (*Job xiv. 1, 2.*) When this moment arrives, may we end our lives as honourably as the tulip does her's ! It has been the ornament of the garden, and the delight of the naturalist. Its death is the more to be regretted, because its life has been pleasing and useful. May the circumstances of our life and death be the same ! " Live so, that when death comes to mow you down, pious people, in regretting your loss, may weep over your tomb, and say to each other, Alas ! why has not so much excellence been longer continued among men ! "

MAY XVIII.

REFLECTIONS ON GRASS.

HOW beautiful soever the flowers may be, which, by the care and industry of man, are cultivated in our gardens ; we can know little of the wonders of the vegetable kingdom if we confine our researches to the *parterre*. Every field, as well as the most artificially embellished garden, is also a theatre of the wonders of God, and has the same claim to our attention.

Can there be any thing more astonishing than the great quantity of grass which is found in one meadow ? Let us suppose a meadow a *thousand* yards in length, and as many in breadth ; its surface would then be a *million* of square yards. And let us suppose that in stepping, we cover ten tufts of grass ; then, a square yard contains a *hundred* of these tufts. Whence it follows, that in casting our eye over that meadow, we see at once a *hundred millions* of these curiously formed machines. Let us grant that each tuft has a *hundred* tubes, by means of which it imbibes nourishment from the earth ; this gives us *ten thousand millions* of regular and perfect tubes ! But who can imagine that a tuft of grass has need only of a hundred tubes for its nourishment and growth ; seeing that each tuft is a series of similar tubes ? What an immense multitude must there be found in the whole meadow ! And how small, in comparison, is the number of plants and flowers which are cultivated in our gardens ! Why has the Creator so prodigiously multiplied the productions of the vegetable kingdom ? Why, from each species of grass, does he cause such an innumerable multitude to spring ? It is, without doubt, that beasts, as well as men, may find their subsistence. Fields and meadows are, properly, granaries for animals.

Another thing relative to the grass, which deserves well to be observed, is, that it requires neither seed nor labour ; and that it grows and perpetuates itself independently of our care. How desolate and parched would our fields and meadows be, if we were obliged to sow the seed of all this grass, and afterward to water what our hands had sowed and planted ? But from the creation of the world, God has taken care that there should not be a deficiency of grass. From that almighty word of God. *Let the earth bring forth grass, the herb yielding seed, whose seed is in itself*, proceeds the uninterrupted fertility of our fields.

If we reflect on the *colour* with which God has adorned the grass, it will be sufficient to induce us to acknowledge the tender care of the Creator. If all the fields were *white* or *red*, who could, for any length of time, endure the splendour ? If the prevailing colour were more obscure or gloomy, how dismal would the whole face of nature appear ? But God considers the state of our sight, and far from injuring or fatiguing it, he strengthens and comforts it. And what is still more remarkable is, that there is such a diversity in this colour, that not

a single plant appears whose green is exactly as bright or as deep as that of another.

Is it not therefore manifest, that in the arrangement of the vegetable kingdom, God has provided not only what is useful, but what is pleasing. This *twofold* attention is very proper to convince us of that sovereign wisdom and goodness which God has extended over the earth. May the proofs of this which he incessantly places before our eyes, never leave us either indifferent or unaffected ! On the contrary, may the reason which he has given us be employed in tracing out this Being of infinite wisdom and goodness in all his works !

As often as we walk in the fields, let us indulge those meditations which the sight of the grass ought naturally to inspire. Lord ! with what wisdom hast thou formed these plants ! With what tenderness hast thou provided for man and beast ! With what bounty dost thou dispense the rain, and the beams of the sun, for the increase of vegetables and other simples, which strengthen our bodies ; milk, which affords so *sweet and healthy* a nourishment ; the flesh of animals, which is given in such abundance ; all these advantages, and an infinity of others, thou grantest us through means of the fields ! For these I bless thee, O my God and Creator : and for these may I for ever praise thee !

MAY XIX.

SENTIMENTS EXCITED BY THE CONTEMPLATION OF THE HEAVENS.

WHO but a spirit of unbounded intelligence and power, could have formed this superb vault which we see above us ? Who could have given these immense globes their motion, that perpetual motion, the velocity of which is inexpressible ; a motion which the smallest grain of sand could not have of itself ? Who has commanded these enormous masses of sluggish and inactive matter to assume so many different forms ? Whence came those connexions, that beauty, and harmony, which shine forth in every part of the great whole ? Who has determined these things so exactly in number, weight, and measure ? Who has prescribed to these immense bodies the laws which could not be discovered but by the most sublime genius ? Who has measured those vast circles in which the planets move, without ever departing a hair's breadth from their track ? Who has introduced them into that course, through which they are to run without interruption ? All these questions lead us to thee, thou adorable Creator ! Thou self-existing, independent, and infinite Being : it is to thee that these heavenly bodies owe their existence, their laws, their arrangement, their power : and all those advantages which they procure to the earth proceed from thee.

What sublime ideas arise in our mind, when we contemplate these grand objects ! If the space where so many thousands of worlds move.

cannot be measured by your understanding : if the globes, which make their prodigious revolutions in it, be of such a magnitude as to terrify us ; if the edifice of the universe which the Creator has reared be of such immensity that all our ideas are lost in it ; what must thy grandeur be, O God ; and what understanding can comprehend it ? If the heavens, and all their hosts, have so much magnificence, beauty, and majesty, that the eye cannot satisfy itself with beholding them ; and the soul is penetrated with admiration ; what must thy beauty be, infinite Creator, of whose splendour and glory these creatures are but a faint shadow, an imperfect image ? What must be the infinite extent of thy wisdom and understanding, since thou seest at one glance all this immense space, and all the innumerable bodies which it contains, and hast so intimate a knowledge of the nature and properties of all the beings which thy hands have placed there ? What a depth of riches, of wisdom, and understanding, must be found in thee, O Lord, who hast formed these admirable plans ; who hast calculated every thing ; and who hast measured the whole with so much exactness, that nothing can be added, and nothing taken away ; who hast conceived and established those different laws which all the globes must observe ; who hast proposed to thyself such sublime ends ; who hast employed the most wise means to accomplish them ; and who hast understood how to put such union, connexion, and harmony, into all thy works ! How great must thy power have been, to realize all these plans, to conduct and direct, even to the present time, according to thy own will, the most immense masses ; to animate all by thy breath, and to preserve the whole by the word of thy power !

But, would God have given us such proofs of his power and glory without having some great end in view ? Shall the heavenly bodies announce the infinite skill, almighty power, and boundless wisdom of the Lord, without effect ? Shall they uselessly dispense that abundance of favours which the Divine Goodness distributes to us by their means ? Are not all these things done, that intelligent creatures may pay attention to them, reflect upon them, and make them the subject of their meditations ? If we admire the masterpieces of an eminent artist, what stupid indifference would it be not to admire the art and infinite wisdom which are manifest in the works of the Most High ? If we honour those who have a talent to execute great and beautiful works ; with what respect, what profound humility, ought we to prostrate ourselves in adoration to that God, who has constructed the magnificent edifice of the universe ; and who has manifested in it so much majesty and so much glory ? The heavens announce his magnificence ; and shall we not proclaim him as the Lord and King of the world ? All the heavenly bodies obey him, and all their revolutions are formed according to the laws which he has prescribed. And shall *man* alone refuse to obey the King of the universe, who also is his Lord and Creator ? Shall he refuse to have his conduct regulated by those wise and salutary laws which he has given ? The influences of the divine bounty descend upon us from all quarters, and bring us

 Contemplation of the heavens.

blessings, conveniencies, and pleasure without number ! What love, what gratitude, do we owe him ! With what diligence should we imitate David, who cried out, when contemplating the works of the Lord, I will sing unto the Lord while I live : I will sing praises unto my God while I have any being : my meditation of him shall be sweet ; and I will rejoice in the Lord. Bless the Lord, O my soul, Hallelujah !

 MAY XX.

FECUNDITY OF PLANTS.

THE magnificence of the terrestrial part of the creation does not shine to more advantage in any thing, than in the astonishing fecundity of plants. A single one produces thousands, yea, and millions of others. One stalk of *tobacco* produces *forty thousand, three hundred, and twenty* grains of seed ! And if from this we calculate its fecundity for the space of four years, we shall find that it may produce *two trillions, six hundred and forty-two thousand, nine hundred and eight billions, two hundred and ninety-three thousand, three hundred and sixty-five millions, seven hundred and sixty thousand* grains of seed ! An *elm*, of twelve years growth, has often produced a *hundred thousand* grains of seed. What a prodigious number may spring from these in the course of a few years ! Supposing that this tree has but *one hundred thousand* buds, and that the shoot of each year contains only *five*, there will be then, in each year, *five hundred thousand* plants, which may be considered as new. If to this we add what is produced by the extension of the root, by grafts, &c. we may well be astonished that the earth itself has not been entirely exhausted by plants !

But we must think also on that countless multitude of animals which derive their nourishment from the vegetable kingdom : they consume a great number of plants annually, and if nature had not endued vegetables with a very extraordinary generative virtue, we might well fear for their total destruction. But the very animals which consume, often propagate them. Birds eat fruits ; but they void the kernels just as they have swallowed them, without being in the least damaged. While they are pecking certain kinds of fruit, they scatter the seed often to a considerable distance. This dispersion is necessary, to the end that one species of plant may not occupy a whole field. It is for this very purpose that certain seeds are furnished with a sort of wings, that they may be scattered about by the wind.

It is certain, that plants are more prolific than animals. Of this we may be fully convinced, by comparing the number of plants with that of quadrupeds. The former produce annually, sometimes during several ages, a great number of new trees : whereas large animals, such as the *elephant*, and the *mare*, bring forth only two young ones at the most ; and are often barren. Small quadrupeds, such as the *dog*, the *cat*, the *rat*, &c. are abundantly more prolific ; but their fe-

Fecundity of plants.

cundity can by no means be compared with that of trees. *Fish* and *insects* come nearer : the *tench* deposits about *ten thousand* eggs : the *carp* 20,000, and the *cod*, a *million*.

Let us now compare this fecundity with that of the *wild rose*, the *mustard*, and the *fern* ; and we shall find that these plants multiply much more than either fish or insects : especially when we consider, that all plants multiply themselves in a variety of ways ; whereas the greatest part of animals have only one way of propagating their species. A tree may produce as many new trees as it has boughs, branches, and even leaves ! In how wise a proportion has God regulated propagation in the vegetable and animal kingdoms ! If the multiplication of vegetables were less considerable ; a great number of animals must die through hunger ; our fields and meadows would be deserts, where a few plants only might appear here and there. But on the other hand, if the Creator had willed that the animals which feed on grass and vegetables, had multiplied more than plants, the vegetable kingdom must have been quickly consumed ; and several species of animals have become extinct.

But, from the relations established between the two kingdoms, the inhabitants of each multiply in proportion, and no species is destroyed. Thus, O man, abundance and pleasure surround thee every where. It is for thy sake that the Creator gives that astonishing fecundity to vegetables. It is for thy nourishment, pleasure, and health, that he has produced such a multitude and diversity of plants. Count, if thou canst, those which cover one field.—Their number cannot be expressed ; and this innumerable multitude is an image of the immensity and omnipotence of the Lord, who in all the kingdoms of nature opens his hand, and satisfies the desires of every living creature.

MAY XXI.

A DESCRIPTION OF THE BEAUTIES OF SPRING.

NOTHING is more worthy of admiration, than the revolutions which the spring produces on our globe. In autumn, every valley, field, and forest, presents us with an image of death ; and in winter, nature is deprived of all her ornaments. The animals are gloomy, the inhabitants of the forests hide themselves, and are silent ; the earth is changed into a vast solitude, a desert, an universal tomb ; and nature seems to have fallen into a state of inaction and insensibility. She, however, labours silently, while we are ignorant of that sacred influence, that divine virtue, which is making preparations for the renovation of nature. Life comes to reanimate torpid bodies ; and all is in expectation of a similar resurrection. In the trees alone, what a multitude of changes take place ! First of all the sap, which, during the winter, had entirely abandoned the branches and trunks of the

Description of the beauties of spring.

trees, begins to ascend slowly in their invisible tubes ; and particularly in the bark, by paths which can neither be guessed at, nor discovered. The sap swells up the buds : and what treasures of divine power are enclosed in these little recesses ! The leaves, with the smiling green which colours them ; the branches, which are to shoot through between the unfolded leaves, new buds attach to these branches, and full of invisible leaves ; afterward that multitude of blossoms, with those sweet exhalations which embalm the air ; in those blossoms, fruit ; and in those fruits, the seeds of an infinite number of other trees.

The delightful splendour of the sun transports and ravishes the soul : and the activity of nature in the plants which surround us, charms our sight. There is no field which does not present the eye with an enchanting landscape, and the *smell* with odoriferous flowers. Almost every bird sings its hymns with more or less melody. How cheerful is the song of the *linnet*, which, fluttering from branch to branch, continues its sounds, as if it wished to draw the attention of man to itself in preference to others, to delight him with its sweet accents. The sprightly *lark* springs up aloft, and seems to hail the day, and welcome the spring with her pleasing notes. The cattle, by their cries, express that vigour and joy with which they feel themselves animated. In the rivers we see the fish, which during the winter had fallen motionless and frozen to the bottom, arise near the surface : they have recovered their former vivacity ; their agility, and their various, easy, and pleasing motions attract and amuse our sight.

How is it that we can so often see all these objects without feeling the most profound and respectful admiration for the grandeur of that Infinite Being, whose power is thus manifested with so much glory ? Never should we breathe the pure and fresh air of spring, without exciting ourselves to such reflections as these. Let us never contemplate a tree adorned with leaves, a field covered with waving corn, an enamelled meadow, a majestic forest ; let us never pluck a flower, nor take a step in a garden, without considering, that it is God who covers us with the delightful shade of the trees ; that it is He who makes the flowers so beautiful, and who sends us their perfumes ; that it is God who clothes the woods and the meadows with that beautiful verdure, by which our eyes are both strengthened and delighted : God, who gives life and happiness to every creature ; God, by whom we exist, abundantly more happy than the thousands of our fellow-creatures ; and by whom we enjoy the pleasures of spring.

As nature feels the blessed influence of the spring, so the Christian feels ecstatic delight, when, after having hidden his face, his God approaches, and restores to his soul the testimony of his grace and salvation. The life of a Christian has its dark nights, and luminous days. When the former continue long, may we not compare that state to the winter ? The energy of the soul is blunted and be-

Description of the beauties of spring.

numbed, and it is almost destitute of spiritual motion and life. He awakes then out of his security ; he now feels more than ever the necessity of depending on his God and Redeemer ; he feels that if left to himself he can do nothing, and that the soul has as much need of the Spirit of Jesus, as the vegetable kingdom has of the influence of the natural sun. But the Lord leaves him not ; he returns, and shows that he can manifest himself to a penitent, believing soul. Then, illuminated by heavenly light, and vivified by Divine grace, the Christian receives such convincing proofs of the love of his God that joy and peace spring up in his soul.

I bless thee also, thou God of mercy, for the precious gift of thy grace. Spring itself would be destitute of charms in my eyes, and would be much less calculated to inspire me with delight, were I deprived of those more sublime joys which thy grace sheds abroad in the heart of the Christian ! While my heart feels thy love, I can the better relish the beauties of nature. Continue to manifest thy presence in my soul, and condescend to cherish in it that blessed hope of one day enjoying the gifts of thy bounty in a better world !

MAY XXII.

THE LANGUAGE OF ANIMALS.

MAN, properly speaking, is the only animal which is endued with the gift of speech ; and in this especially his superiority over all other animated beings is manifested. It is by means of speech that he extends his empire over all nature ; that he raises himself to his Divine Author ; contemplates, adores, and obeys him. It is by this that he learns to know himself, and the creatures which are around him ; and that he is enabled to make them subservient to his interests. All animals, man excepted, are deprived of this faculty ; because they are destitute of reason, which is what capacitates us to acquire the languages, and to know the use of speech. But, as animals make their wants and feelings known by natural signs ; so they utter certain sounds which express their sensations, and in this respect we may allow them a sort of language. The diversity of these sounds, their number, use, and the order in which they succeed each other, form the essence of the language of animals.

To form a just idea of this we need not have recourse to laborious researches : it will be sufficient to observe the animals which are daily before our eyes ; and with which we have, in a certain sense, a familiar intercourse. Let us examine the *hen* and her *chickens* ; when she finds any thing, she calls and invites them to it : they understand her, and come instantly. If they lose sight of this tender mother, their plaintive cries express the distress they are in ; and the desire they have to find her. Pay attention to the different cries of the *cock*, either when a stranger or a dog enters the yard ; or when a

Language of animals.

hawk, or such like bird of prey, presents itself; or when he calls to, or answers his hens. What do the lamentable cries of the *turkey* mean? See her young immediately hide themselves, and lie so still, that one would imagine them dead. The mother looks upwards, and her anxiety is redoubled: but what has she discovered? a black point that we can scarcely distinguish; and which proves to be a bird of prey, which could not escape the vigilance nor the piercing eyes of the mother. The bird of prey disappears, and she sets up a cry of joy; her anxiety is at an end; the young ones revive, and assemble joyfully about their mother.

The language of the *dog* is so various, copious, and expressive, that it would be sufficient of itself to form a dictionary. Who can be insensible to the joy which this faithful domestic shows at the return of his master? He leaps, dances, runs hither and thither, turns with a graceful precipitance round his master: suddenly stops, fixes his eyes upon him with the greatest tenderness; approaches, licks, and caresses him several times. Then recommencing his gambols, he disappears; then returns, dragging something after him; assumes all sorts of pleasing attitudes; barks, tells every body his happiness, and evidences his joy in a thousand ways. But how different are the sounds which he utters now, from those which he makes after night, when he perceives a thief, or a beast of prey? If we follow the *pointer*, we may observe how he communicates his mind by his motions, and particularly by those of his tail: and with what address he associates his gait, and his different signs, to the discoveries which he wishes to impart.

This may afford us an opportunity of admiring the wisdom and goodness of the Supreme Being. What tender care has he manifested to the animals, in giving them power to express, by sounds, their wants and feelings! From their organization, and the nature of their soul, it is impossible that they should speak the language of man; but they would have been much to be pitied, and less adapted to our use, if the Creator had entirely deprived them of the power of making themselves understood by enabling them to utter certain sounds: they are compensated for the privation of speech. And he has endued them with the address to communicate their sensations to their fellow-creatures, as well as to man, in a thousand little ways. He has provided them with organs culculated to produce and vary a certain number of sounds; and their structure is such, that each species has distinct and peculiar tones, by which they convey their meaning. Hence it is, that when we blow into a windpipe of a dead sheep, or cock, you would imagine you heard the animal itself. In a word, the Creator has given the language of animals all the perfection which their nature could admit of, and all that the end for which he created them required.

How perfect does man appear when he is considered in regard to the gift of speech! The language of animals consists in a multitude of imperfect, inarticulate sounds. They have no ideas but what come

Language of animals.

through the medium of their senses, because they are incapable of learning a methodical language. They only know objects by certain sensible qualities, to which all their judgments, and all their comparisons, are limited. As to us, we possess faculties in all respects far superior; we can arise to general notions, and separate the object from the qualities which distinguish it. We can, through the medium of an infinite number of arbitrary and articulate sounds, express all our conceptions; we can understand the relations which connect us to other beings, act in consequence, and thus ensure our felicity.

O Lord, our Creator! what obligations are we under to thee! Let us never forget this important part of thy benefits. As often as we speak, may it be to show forth the excellence of thy wisdom and goodness, and the eminent privileges with which thou hast favoured us!

MAY XXIII.

THE NUMBER AND MAGNITUDE OF TERRESTRIAL CREATURES.

THE works of the Lord are vast and numerous! This we must have acknowledged, had we known those only which the earth contains: for how great is the extent of our globe, the abode of so many different nations! These occupy vast territories in it; nevertheless, how many deserts and wastes still remain which have never been inhabited by man! And what is still more striking is, that the land taken altogether, does not occupy near so great a space on the globe, as that prodigious assemblage of waters, the sea. But if the earth itself be a proof of the greatness of the works of the Almighty; we cannot cast our eyes on the creatures which it contains, without admiring, at the same time, the amazing number and diversity of these works.

First, we find innumerable kinds of stones, metals, and minerals, hidden in the bowels of the earth. And what an astonishing variety of trees, plants, fruits, and vegetables, cover its surface! Notwithstanding all the trouble which has been taken to observe and classify the different species of herbs, the business is yet far from being complete: and it is probable, that all the efforts of future naturalists will ever be inadequate to its accomplishment. Let us, next consider the living creatures: what a prodigious diversity do they afford! Between the *eagle* and the *gnat*, the *whale* and the *gudgeon*, the *elephant* and the *mouse*, the disproportion is immense; nevertheless, the intervals which separate them, are completely filled up with living creatures. The various species of animals come so near to each other, that it is sometimes difficult to distinguish one from another; yet these species are so multiplied, that from the *gnat* to the *elephant*, they form an extensive chain, each link of which is connected with the preceding. In the seas, lakes, and rivers, on the surface of the earth, and in its bowels, there is scarcely a point, which in one way or other, does not serve for the abode of some living creature.

 Number and magnitude of terrestrial creatures.

But however great the number of living creatures which we have under our eye may appear ; they are almost nothing in comparison of those which are too small to be seen by the naked eye. By the assistance of the microscope, discoveries almost incredible are made ; of which any person, who has the opportunity, may be convinced by his own eyes. By these means, a new world, which was before to us entirely unknown, presents itself to our view. Here we see living creatures, the extreme minuteness of which can scarcely be conceived by the human imagination ; for some of these animals are scarcely equal in size to the *millionth* part of a grain of sand ! And it is not their number and diversity only which should strike us with astonishment ; but likewise their beauty, and the delicacy of their structure. What appears coarse to the naked eye, seen through a microscope, has a splendour and delicacy which surpasses imagination. Gildings which art cannot imitate, shine in the smallest grain of sand ; but especially in certain parts of insects ; for example, on the head and eyes of a small fly : and we observe, in the structure of the most insignificant animated beings, the most exact symmetry, and the most admirable order. In a word, we find millions of creatures so small that the eye cannot perceive them without the assistance of a glass, as well organized, perfect in their kinds, and as well calculated to accomplish the different designs of the Creator, as the great animals with which the earth is peopled.

Considerations such as these, should give us a lively sense of our own littleness. We are lost in this innumerable multitude of the creatures of God, which would be sufficient to attest his grandeur, though ourselves, and millions more of our fellow-creatures, were deprived of existence. O Almighty God, how immense is the extent of thy dominion ! In all the elements are found creatures, which thou hast formed, and which thou preservest. Every grain of sand is a habitation for insects, which are also in the class of thy creatures, and which form links of an immeasurable chain. Here our ideas are lost in infinitude. The more we meditate on the grandeur and diversity of thy works, the more we feel the limits of our understanding. We may add number to number, and not be able to find a sum which shall compromise the amount of thy creatures. It is impossible for us to determine it. Probably the power to comprehend these, is the lot of angelic beings only. Our business is to adore thee, the Creator and Preserver of all things !

 MAY XXIV.

SPRING IS A PICTURE OF THE FRAILTY OF HUMAN LIFE, AND AN EMBLEM OF DEATH.

WE need not go far in this season to seek for emblems of frailty and death ; they present themselves to us on all hands, being connected with almost all the beauties of nature. Undoubtedly the design of the

Spring a picture of the frailty of life, and an emblem of death.

Creator even in these, was to remind us of the inconstancy of terrestrial things ; and to repress that dangerous propensity which we have, to give up our affections to objects as empty as all those are which nature produces. Spring is the season in which the plants receive a new life ; and it is that also in which we see the greater part of them perish. Serene as the days of spring may appear, they are suddenly obscured with clouds, showers, and tempests. Sometimes the morning presents itself to us in all the splendour and majesty of its charms : afterward, before the sun has reached the meridian, the splendour which flattered us with the hope of a fine day disappears. At other times this hope is realized, and the days of spring shine forth in all their beauty. But how soon do these serene days pass away ! How rapid is their flight ! They vanish before we have fully enjoyed them. And thus the most beautiful part of our life flies away, compared so often to the spring of nature. Often in the morning, every thing smiles on us, every thing promises joy and happiness : but before the evening comes, and even mid-day, we experience disagreeable moments, and tears of sorrow are often wrung from our eyes. Let us look back on those years of our youth, which may be termed the spring of our life. O how short-lived have the pleasures of our youth been ! Nothing could have been more diversified than the pleasures which we then enjoyed ; but where are now those happy moments, those transitory joys ? What is become of our constant cheerfulness, and those roses of youth which ornamented our cheeks ? We find no longer any taste for those noisy pleasures which then encompassed us. What then remains of those beautiful days which are fled away ? Nothing but a melancholy remembrance, if they have not been sanctified by being devoted to our Creator.

With what energy does the spring preach to us the frailty, and the end of life ! See how far its beauties extend ! Behold how the trees are covered with blossoms ! But let us not exult too much in their splendid appearance : in a few days they will return to the dust, whence they came. All that brilliant race of flowers, so diversified in their forms and shades, must die in the same spring in which they were born. Thus our life vanishes away, and its longest duration may, in some sort, be compared to a day in spring. An unexpected death hurries us into the grave ; while that health and strength which we enjoyed, promised a long course of years. Often sickness and death come upon us the more certainly, as their snares were disguised with the charms of health and youth. We may view, in the flowers of spring, an emblem of our own frailty, and thus address them : “ O ye, who are adorned with such charms, the honour of our gardens, the glory of our vallies, how transitory is your beauty ! But what a picture ! How instructive to me ! Thou Death ! which I carry in my bosom, speedily shall I feel thy stroke ? O rose, thou livest but a day ; and I may perish in a moment ! ”

Though these thoughts should make us deeply serious, yet they should not rob us of those comforts which the Creator has dispensed

Spring a picture of the frailty of life, and an emblem of death.

to us in the spring of our life. The thought of death is very consistent with the enjoyment of every innocent pleasure. Far from bringing gloominess into our hearts, it may instruct us in the art of rejoicing constantly in the Lord ; and may preserve us from the abuse of terrestrial pleasures. It may inspire us with the desire of a solid and uninterrupted felicity. The beauties of the visible world will enable us to form an idea of the invisible and celestial world ; and when the time comes, in which we shall wither away like the flower of the field, we may say, with Christian fortitude, " Although my life, like a flower, fade and turn to dust ; although those cheeks where the roses of youth glowed, shall become a prey to corruption : I hope for a better life, which shall not be taken away from me ; and a body over which corruption shall have no power. Then shall I appear before thee, O my Divine Head ; full of ecstasy, I shall behold that glory which was the object of my faith ; for thou wilt satisfy me with eternal happiness. How blessed should I be, if Death, in breaking my chains, should this day put me in possession of this sovereign felicity !"

MAY XXV.

SPRING IS AN EMBLEM OF THE RESURRECTION OF THE BODY.

MOST of the flowers which we now admire, were lately but coarse and shapeless roots ; but at present they are the ornament of the earth, and the delight of our eyes. What a beautiful emblem is this of the resurrection of the righteous, and the state of their revived bodies ! As the roots of the most exquisite flowers, while buried in the earth, are without form and beauty, but when they flourish anew, are clothed with a thousand charms ; so the human body, which while in the grave, is only an object of horror, shall experience a most astonishing change in the day of the resurrection : it was sown in weakness, it shall be raised in power ; it was sown in dishonour, it shall be raised in glory.

As soon as spring has succeeded winter, life and joy succeed (in the heart of man) those gloomy impressions which a severe season produced : and the first fine days of spring cause us to forget the gloomy days of a long winter. Just so shall we forget, in the great day of the resurrection, all the melancholy and gloomy days of our past life.—Here, the clouds of affliction may cast a gloom on our countenance ; but, when the days of the new creation shall dawn, grief shall be no more : nothing shall be able to trouble the serenity of the soul—a heavenly joy shall fill it for ever !

Spring is the general renovation of the whole earth ; as dull as it appeared during the winter, so pleasing and delightful is its aspect now. Every object pleases and delight us ; and we can scarcely help imagining, that we are transported, each spring, into a new and more joyous dwelling. Thus in the day of the resurrection, we shall find

Spring an emblem of the resurrection of the body.

ourselves transported into a new, magnificent, and delightful habitation. The new heaven and the new earth will be freed from all the apparent or real defects of this globe which we now inhabit. Peace, order, beauty, and righteousness, shall render our future abode the most happy that we can possibly conceive.

When the warm rays of the sun have penetrated the earth, thousands of plants and flowers, of different kinds, proceed from its bosom. In like manner shall it be on the great day, when thousands of generations shall arise from the dust in which they have been buried. As the flowers of spring arise from their seed, full of beauty and splendour; so the body of the Christian, which has been deposited in the earth, shall one day arise, encompassed with glory, and clothed with celestial beauty.

Spring is the epoch of vegetation for grass, flowers, and plants of all sorts. Then every thing that begins to sprout above the surface of the earth, unfolds itself more and more every day, and visibly increases. Thus the day of the resurrection shall be to the immortal spirit of the Christian, the epoch of that unlimited progress which he shall make in goodness: then, no weakness, no obstacle shall prevent him from proceeding in the path of perfection. He shall go on from strength to strength, from one degree of felicity to another.

In the spring, all nature seems to arise out of sleep to praise its Author; the accents of the inhabitants of the air unite in a universal hymn to glorify the Being who has formed them. Similar songs of joy shall resound in the day of their resurrection, from that world of God's chosen which he shall have again restored to life.

With what ecstasy will the soul of the Christian be filled! Let us compare the greater with the less; if the earthly spring be so rich in ornaments, what shall the beauty be, what the happiness, of that spring-time of the new world!

MAY XXVI.

THE ATTRACTIVE POWER OF BODIES.

WE often see two bodies approach each other, without being impelled by any external force. The motion which produces this effect, is called *gravitation* or *attraction*. It seems that the attractive power is one of the principal springs of nature. It is by virtue of this law, that fluids ascend in capillary tubes: and it is partly owing to this, that the sap ascends in plants, and the blood and other juices circulate in animals. It is true, that the expansive power of the air contributes its part, at least in plants; as a portion of air is found in the fluid by which they are nourished. Plants are provided also with air vessels, which imbibe the external air, and this contributes to the ascent of the sap: but attraction is doubtless the principal cause of this phenomenon. Every person knows, that the human body is a series of capil-

The attractive power of bodies.

lary tubes, in which the various humours are in continual motion : and this motion is partly regulated according to the laws of attraction. A multitude of phenomena, which are observed in the corporeal world, have this attractive power for their principle ; and it is by this that the motion of the celestial bodies can be most satisfactorily explained. These enormous globes, separated from each other by immense intervals, must be united by some secret bond, in order to form such a grand whole as our solar system. It is generally granted, that the union of the celestial bodies, their direction, the law which prevents them from deviating from their prescribed path ; the motion of the planets and comets round the sun, all depend on the attractive power of the sun ; and the gravitation of these bodies towards him. What admirable wisdom is this, which, by means of the same law, produces vegetation in the smallest spire of grass, and the motion of the whole system of the universe !

These reflections may lead us to glorify the supreme wisdom. If it manifests itself in the celestial bodies, it is equally visible in the government of rational creatures. The Creator acts, in this respect, according to principles equally wise, after the same laws, accomplishing every thing with the most astonishing simplicity. But we are so blind that we do not observe this, because we generally suppose that those things only which have the appearance of pomp and splendour, are worthy of our attention. But why should we not acknowledge, in things which appear to us of little importance, the traces of divine wisdom which are so evidently impressed upon them ? When cities or countries are ruined by earthquakes, overwhelmed by water, or destroyed by fire, we are generally attentive, and see that such revolutions are the work of the Ruler of the world ; and are constrained to acknowledge his wise providence.

But should extraordinary events only, remind us of the wisdom, holiness, and justice of God ? What ! does not the grandeur of the Supreme Being discover itself as well in the smallest blade of grass, and in the meanest insect, as in the motion and harmony of the spheres ? Yes, in the small, as well as in the great, God manifests the glory of his attributes. It is through inattention or negligence that we do not perceive this every where ; even in the smallest beings, and in the most trivial events. To be convinced of the wisdom and goodness which reign in the empire of Providence, we have no occasion to go to very distant objects. We need only dwell on what relates to ourselves, and to the particular dispensations of Providence in our own behalf. Our life, and the events by which it has been distinguished, may teach us how wise the means were which he has chosen to promote our happiness : how many little circumstances his providence has combined to effect this purpose ; and how numerous the means are which he employs to preserve us from evils, or to procure us blessings !

MAY XXVII.

COMPLAINTS OF MEN RELATIVE TO CERTAIN INCONVENIENCIES IN THE
LAWS OF NATURE.

“WHY is the human body, from its constitution, subject to so many infirmities and accidents?” Let him who asks this question say, whether it be possible to imagine a body that unites more advantages than that which he has received from his Creator? It is inconsistent with nature, and the connexions of things below, that man should be provided with an invulnerable body. If one of our fellow-creatures be deformed, another lame, a third deaf or dumb, is this a reason why we should murmur against God? Are those defects so common, that we have room to complain of them? Ye who are disposed to murmur, answer these questions: and if ye still think you have a right to complain, reflect on the following truths.

It is necessary to men in general to have some proofs of those defects, to which the human body is liable. For, as soon as a healthy and well-formed person compares himself with one who is crooked and deformed, he perceives the advantage of having well-formed limbs, and learns how to esteem a blessing which till then he had not properly considered, and is taught to take more care of its preservation. How valuable is each eye, each ear, each organ of sense, each joint, each limb; if we only pay attention to the small number of those who are deprived of them! Would any of us take the greatest treasure in exchange for one of our limbs? Are not our bodies more beautiful and regular than the best constructed building, or the most curiously wrought machine? And though those be far inferior to our bodies, we are far from supposing that their composition was the effect of chance.

“Why do some countries differ so much from others; sometimes cold, sometimes wet; sometimes low, sometimes high?” O man, if thou hadst power to form a globe, where every thing should contribute to the welfare of men and animals, could thy wisdom furnish a plan more excellent than that on which our own is formed? It is in consequence of their diversity, that the countries of the earth produce those exhalations, and variety of winds, which constitute that mixture of air, which experience shows us is best calculated for the health and comfort of men and animals; and for the propagation and growth of plants.

“But is it not incontestable, that the variations of the weather are not advantageous to all men, and to all countries?” But has not the preceding weather influenced the following, as the temperature of one country often influences that of another? Have we a right to judge of the whole? Should a thousand farmers sigh in vain for a shower, because drought would agree better with the particular arrangements of one housewife? There may be a state of the air which may occasion a temporary barrenness here or there; but can we term that an

evil, which is necessary to prevent a corruption of the atmosphere? Should an east wind (which is favourable to a whole country) cease to blow, because its violence may wreck some vessel, or be injurious to some consumptive people? Is it reasonable, when we cannot comprehend the whole, to attempt to blame, or find out imperfections in a part?

“But, why are there so many noxious animals?” Does the objector think that there should be no rapacious animals, great or small, upon earth? Know this, that it is precisely these beasts of prey which restrain the number of these animals, which would otherwise become burdensome to us. And, it is because many animals serve for food to beasts of prey, that their number increases annually. If ravenous beasts did not exist, the dead bodies of animals on which they feed, far from being useful to living creatures, would become injurious. All the animals thus devoured, are replaced by others; and in almost every case population is regulated by the means of subsistence: hence gnats, and other insects, would soon lack support, if the animals which feed on them did not prevent them from multiplying too fast.

“How comes it, that the Creator has regulated the course of nature by such invariable laws?” It is by means of this very arrangement, that man, assisted by labour, and guided by experience, can use his understanding and strength; and thus become, in a certain sense, the artificer of his own well-being. Could we wish to dwell in a world where, when hungry, we should only need to desire food, in order to be satisfied? Or, where garments should fall from the clouds, when, travelling in a cold night, we had neglected to provide any? Or, where we could at pleasure, without using any means, walk sometimes on land, sometimes on the water, and sometimes in the air? Where the stomach would never be overloaded with aliments; where the axe should swim in the water into which it accidentally fell: where bodies departing from their natural direction, should describe an oblique line, lest they should hurt any person by their fall? Would we wish to dwell in a world, where we should have no need of activity, where we could contribute nothing to the multiplication of our pleasures; where there should be no rule, no fundamental law; or finally, where the best, the bad, and the worst, being equally unknown, nothing could render us attentive to the laws of nature?

Doubtless, there will ever be a number of things in nature, the purposes of which, and the relation they have to the whole, must remain hidden from us. We may find some, which to our limited understanding, may appear contradictory, and ill adapted to the plan of the Deity: but in all such cases, let us adhere to this principle: God does all for wise and beneficent purposes. And when these enigmas, these inexplicable things, present themselves to us, let us say with the apostle, O the depth of the riches of the wisdom and knowledge of God! His judgments are incomprehensible, and his ways past finding out! For who hath known the mind of the Lord; and who hath been his counsellor? For of him, and by him, and for him, are all

things : and to him be glory for ever and ever ! Amen. *Rom. xi. 33, 34, 36.*

MAY XXVIII.

SINS TO WHICH WE ARE PARTICULARLY PRONE IN THE SPRING.

IS it possible that we can profane, by sin, a season which is especially made to animate us to the practice of piety ? Would it not be natural to suppose, that in these days of spring, every field should be to us a temple in which we should offer a thousand sacrifices of praise and thanksgiving ; where every thought, sentiment, and act, should be referred to the glory of our Creator ? But alas ! we daily see that men are ungrateful towards their heavenly Benefactor. They see nature renewed ; they see the flowers, and a thousand other delightful objects, without thinking of Him who made all these things ; or if they do think of God, they forget to return him thanks for the wonders of his goodness. This vice of ingratitude particularly prevails at this season : and is often the fruitful source of many others.

Man seems to be the only creature on the earth who is not sensible of his happiness ; although he alone has the power to reflect upon it, in all its extent. Insensible and ungrateful soul, to thee I address myself at this time. But, there is much reason to fear, that thou wilt pay little attention to *me*, who art inattentive to that God who speaks to thee in nature with a voice so energetic and intelligible. But, is it possible that thou shouldest forget thy Creator ? All his works manifest him ; and thou canst neither know thyself nor the world in which thou livest, if thou knowest not thy God. Every creature reminds thee of its Author : every place in his vast dominion of nature is full of the Deity. He manifests himself in every blade of grass ; in every flower, and in every bird. He constantly borrows the sweet and persuasive language of nature, and addresses himself to thy senses, thy reason, thy conscience, and to each of thy faculties. Only listen to this language, and thou wilt probably become sensible and grateful.

How is it that thou employest these fine days of spring ? It is right that thou shouldest leave thy chamber where thou hast been hitherto shut up, that thou shouldst breathe the balmy air ; that thou shouldest go and visit the fields and gardens in order to contemplate the beauties of the season : but take heed not to abuse it, by giving way to sinful and extravagant pleasures, which lead in their train indolence and repentance. Thou never canst truly enjoy this fine season, till thy attention, being fixed on the works of thy Creator, thy reason shall discover his Divine power and goodness in them : then thy heart shall experience joys infinitely superior to the pleasures of those who forget the God that formed them. Why wilt thou seek those pleasures which offend God, and wound thy conscience ? Here plea-

Sins to which we are prone in the spring.

tures are found : and to enable thee to enjoy them, thou hast received thy senses, and art endowed with reason and sensibility.

Let us now turn our attention to those persons who, in this season of the year, are apt to give way to anxious cares and fears, lest they should not find sufficient means of subsistence. O ye of little faith ! you deserved some indulgence, when in the depth of winter, pressed by many wants, ye fell into sadness and anxiety : but at this time it is an unpardonable diffidence to fear the lack of support. Consider the grass, the flowers of the field, and the blossoms which cover the trees. Why has God caused the seed to spring out of the earth ? Why has he adorned it with so many flowers ? For whose advantages is it that he has caused every animal to find its nourishment ? Weak and timid souls, be strong, and put your confidence in your heavenly Father. Spring is the season of hope : let it gain admission into your hearts : and if any uneasiness should happen to glide in, cast your eyes upon the fields and meadows, and remember the words of your Redeemer : “ If God so clothe the grass of the field, if he feed the fowls of the air : how much more will he nourish thee, O thou of little faith ! ”

Let us then employ this pleasing part of the year in contemplating the wonderful works of God. Let the pleasures which nature deals out so liberally at this time, excite us to rejoice in the inestimable privilege which we enjoy beyond millions of other creatures, of knowing the Most High to be the author of all happiness. And, if we find any of our fellow-creatures fretful or negligent, let it be a mean of stirring us up to more gratitude and diligence, that we may be distinguished from them by devotion and holiness.

MAY XXIX.

THE HARMONY AND PATRIOTISM OF BEES.

HARMONY and patriotism are, without contradiction, the foundation of that happiness, which, in a certain measure, is enjoyed by bees. At least it is evident, that their republic must be immediately destroyed, if they did not live together in a state of union. We are informed by those who have communicated their discoveries on this subject, that when these insects return to their hives, laden with building materials for their cells, some of their companions are found constantly ready to ease them of their burdens. The travellers again begin their journeys ; and while they are collecting fresh materials, the labourers who stay in the hive, knead together the little parcels which the others have brought, and reduce the whole into a mass proper for building. Others who are not immediately employed in building, are busy in rendering kind offices to the labourers, and bring them food, that the work may go on without interruption, and that they, in the mean time, may want nothing. This *harmony* nearly

Harmony and patriotism of bees.

resembles the *patriotism*, which is also observable among the bees. The riches of the state are the riches of each citizen ; and this numerous republic consists only of one family. Here there is no personal interest, no avarice, and consequently no rapine. Here, no troop of bees ever unite to do violence to, or fight against their fellow-citizens. Here no bee is ever found desiring superfluity, while another wants necessaries : nor do they ever strive to acquire more honey, when they have laid up a sufficiency of provision for the winter.

We may well learn from these insects, however despicable they may appear in our eyes, those virtues on which the quiet and happiness of our lives depend. In whatever state or condition we may be found, it is necessary that we should, in the true spirit of patriotism, act in concert with our fellow-creatures. The society in which we live, Christianity, and our own happiness, require this. Let us cheerfully bear our part of the general burden ; and if it be necessary, let us take up the burden of another, who, through ignorance or weakness, is found deficient. And when religion, duty, and conscience, require us to make great sacrifices for our brethren, let us never consider this as a loss, but rather an honour, that we are capable of labouring with more zeal and success than others. Let the vile principle of selfishness never be found in our hearts. They are despicable members of society, who endeavour to enrich themselves at the expense of another : and appropriate to themselves alone the treasures of their country. When we can in any way contribute to the general good, let not the fear of being unrewarded prevent us. Are not eternal blessings, and the testimony of a good conscience, a sufficient recompense ?

It is, however, but too true, that among the evils of this life which we bring upon ourselves, this may be reckoned one ; that perfect harmony in characters and sentiments does not prevail. But even this may lead us to admire the wise providence of God, who, notwithstanding the disunion and the disorder that reign in the world ; notwithstanding the self-interest which governs mankind ; still supports society, and renders it flourishing. When a pilot so steers his vessel as to shun the sandbanks against which the waves would dash him, it is then that I admire his skill and experience. And when I see, notwithstanding the wickedness of men, in the midst of the storms of their passions, that the dominion of wisdom and virtue is still preserved ; I admire the infinite wisdom of Him who governs the world. How happy shall that new world be, to which I steer my course ! What harmony shall reign in the hearts of its inhabitants ! I shall bless the moment that shall introduce me into those mansions of felicity.

 Number of plants on the earth.

MAY XXX.

THE PRODIGIOUS NUMBER OF PLANTS ON THE EARTH.

MORE than 20,000 different plants have already been found out, and new ones are daily discovered. By the assistance of the microscope, some have been found, where they were least to be expected. *Mosses* and *sponges* have been classed among vegetables, and have presented to the eyes of the naturalist, seeds and flowers before unknown. *Freestone* is often covered with brown and blackish spots; the same is seen on the best polished glass. This mouldy substance attaches itself to almost every thing; it is a garden, a field, a forest in miniature, where the plants, notwithstanding their extreme smallness, have visible seeds and flowers. If we reflect on the quantity of moss which covers even the hardest stones, and the most barren places; on the abundance of herbs which is seen on the face of the earth; on the different kinds of fine scented flowers; on all the trees and bushes, each of which may be considered as an assemblage of a thousand different vegetables: if we add aquatic plants to the number, the fineness of which equals a hair, most of which are unknown to us, we may, in some measure, form an idea of the multitude of plants which grow upon our globe.

What is most wonderful in this is, that all these different species of plants are preserved without one destroying the other. To prevent this, the Sovereign of nature has assigned a place to every species of vegetables analogous to its peculiar properties. He has distributed them over the face of the earth with so much wisdom, that no place is destitute of them; while, on the other hand, none has too great an abundance. Hence, some plants require the open field, where they are exposed to the sun, not being able to subsist in the shade: others cannot thrive but in the water; and here the different qualities of the fluid matter occasion great varieties. Some plants grow in the sand, others in marshes and fens, which are from time to time covered with water. Certain vegetables bud on the surface of the earth, others unfold themselves in its bosom.

The different strata which compose the bed of earth, sand, clay, chalk, &c. have each their peculiar vegetables: hence it is, that in the vast garden of nature there is no place absolutely barren: from the finest dust to the hardest rock; from the torrid to the frozen zone, each soil, each climate supports plants peculiar to itself.

Let us attend to another circumstance, highly worthy of our admiration: the Creator has so regulated matters, that among this immense variety of plants, those which are most proper for food or medicine, either to man or beast, grow in greater abundance than those which are of less utility. Herbs, both in their genera and species, are abundantly more numerous than trees and brambles. There is more *grass* than *oaks*, more *cherry-trees* than *apricots*; more *vine-stocks* than *rose-bushes*. It is evident that the Creator, by this arrangement, has

 Number of plants on the earth.

provided for the general good. To be convinced of this, let us suppose the fact to have been the reverse : that there had been more oaks than grass, more trees than herbs and roots, what difficulty must animals have had to subsist, and how many of its charms, and how much of its variety, must the surface of the earth have lost !

Almighty, omniscient, and infinitely good Being ! here also I acknowledge the wonders of thy providence. It requires no effort of mind to comprehend that thou art great and good : we have only to contemplate the widely extended vegetable kingdom to be convinced of this.

In these beautiful days of spring, let us excite our souls at the sight of so many vegetables which cover the earth, to glorify the power and goodness of our Creator. Wherever we go, we walk on plants and flowers ; and as far as we can extend our view, we discover fields and meadows covered with the rich blessings of heaven. If each spire of grass were capable of praising its Author, how many reiterated millions of hymns should arise to Him out of even the narrow compass of one meadow ! But, O ye beautiful productions of the vegetable kingdom, ye have no need of language ; your inimitable dress, your immense number, and the advantages which ye afford the earth, sufficiently proclaim the goodness of the Creator : and your appearance is sufficient to induce us to approach him with heart and voice. Yes, even by you I feel myself drawn to present a sacrifice of thanksgiving to our common Creator. Lovely creatures, continue to flourish ! I shall often contemplate your excellencies : and I hope never to do it without a sense of gratitude to my God.

 MAY XXXI.

THE PLURALITY OF WORLDS.

IT is not so much through ignorance, as through self-love and pride, that we give the appellation of *habitable world*, to one of the smallest parts of the universe ; persuading ourselves, that our globe alone is peopled ; that the sun was made only to communicate light and heat to us : that the moon and all the stars have no other destination than to brighten our nights, and to point out the road to travellers. The contemplation of the fixed stars is sufficient to overthrow this ridiculous opinion. The sparkling appearance demonstrates that they shine by their own light : and seeing they are visible to us notwithstanding their immense distance from our earth, the fair inference is, that they surpass even the sun himself in magnitude. Can we then conceive, that these celestial bodies, which are not luminous points, but great suns ; these bodies so numerous, and placed at such a distance from our globe, should not have been destined for more excellent ends ?

If they were only designed to serve as nocturnal lights to us, they could be of no use during the greater part of the year. The cloudy

Plurality of worlds

atmosphere which often surrounds us, together with the short nights, which are bright enough without their assistance, would render them useless. Besides, the stars which we cannot perceive by the naked eye, because of their vast distance, would be absolutely superfluous; and their supposed destination would be more completely accomplished by a single star nearer to us, than by so many millions at such a distance. As we may apply the same mode of reasoning to the whole of that use which we make of the stars, whether for navigation or any other purpose, we must confess, that it would be utterly impossible for us to see the utility of so many suns, if no creatures beyond our globe profited by their light and heat; or if they themselves were not the abode of different beings.

This consequence will appear still more reasonable, if we consider our solar system more attentively. In one of our preceding discourses, we have seen that the moon, in many respects, resembles our earth: that in her, as well as on our globe, we discover continents and seas, mountains, vallies, islands, and gulfs. Such striking similitudes authorize us to admit others, and to conclude that in the moon there are minerals and vegetables, animals, and rational creatures. The analogy between the moon and the other planets, lead us to extend the same conjectures to *them*: and as each fixed star has, according to all appearance, like our sun, its particular planets, so these planets undoubtedly resemble ours.—Thus, we see around us an innumerable multitude of worlds, each of which has its peculiar arrangement, laws, productions, and inhabitants.

How numerous are the works of our God! How majestic is this starry heaven! How great must the Creator of it be! Millions of worlds proclaim his glory, and the intelligent beings which dwell in them, acknowledge and adore him who has formed them. What motives to induce us to join those heavenly choirs, that his praises may resound from all parts of the universe! Blessed prospect, which is opened before us into the eternal world, where we shall be able to know and comprehend the wonders of the universe! What shall our astonishment be, when we shall discover so many new objects, or such as we had at least but imperfectly known! In what glory will the divine perfections appear, whose empire extends over such a multitude of worlds; while many foolishly imagine this empire extends only to that little globe which we inhabit. What an unfailing source of various knowledge, and what abundant matter to glorify the Creator and Governor of so many worlds!—

MAY XXXI.*

A HYMN OF THANKSGIVING.

CELEBRATE the praises of the Lord, and adore him. Praise, exalt, and sing to the Creator of all things, all ye intelligent creatures! How marvellous is his power, and how beautiful are his works!

A hymn of thanksgiving.

How great is that power which has created heaven and all its hosts ! that heaven whose pomp and splendour announce the glory of the Parent of light and life ! The eye is never wearied with the objects which it contemplates in the universe, for it always discovers new beauties.

It is not for the eye only that God has created these pleasures ; the beauties of nature speak unto the soul, and overwhelm it with joy. With what art has the Creator varied these beings ! he refuses to one what he grants to another ; and yet, all are wonderful !

O man ! is there a blade of grass, a leaf, or a grain of dust, which does not proclaim to thee the council of the strong God ? How rich is he in power and beneficence ! But alas ! how often does he find thee insensible ; thy eye turns away from his works, and thy heart acknowledges not his gifts !

But, seeing his creative hand has scattered life and beauty through all things ; is it not to exercise thy senses, thy reason, and thy heart ? Is it not for *thee*, that he has created, preserved, and adorned so many different beings ?

Thy God has need of nothing : it is for *thy* happiness that he has adorned the creation with so many charms ; and that he has endued thee with a sensible and intelligent soul. Wouldst thou, O mortal ! renounce this happiness, and refuse to open thy soul to joy ?

O why wilt thou seek happiness in that which is false and deceitful ! Turn thine eye to thy God ; from him thou mayest derive happiness : enjoy the blessings which he has prepared for thee : never shall repentance follow such pleasure !

It is himself who has kindled up the desire of happiness in thy heart : and created sources of pleasure for thee that shall never run dry. Be attentive to his wonders. Seeing the omnipotence of the Creator is no other than beneficence, can any measure of happiness be wanting to the creature ?

Yes, thy happiness is the grand end of his miracles. Let us taste and see that the Lord is good. If this world, which is only his footstool, shine with so many charms, how ravished shall we be with the beauty of his throne, and the majesty of God himself !

Celebrate the praises of the Lord, and adore him. Praise, exalt, and sing to the Creator of all things, all ye intelligent creatures ! How marvellous is his power, and how beautiful are his works !

A hymn of praise to the Creator.

JUNE.

JUNE 1.

A HYMN OF PRAISE TO THE CREATOR.

O CREATOR, when in adoring thee I reflect on thy power, on the wisdom of thy ways, and on that love that watches over all that exists ; filled with admiration, I know not how to praise thee worthily ; thee, my Creator, my Father, and my Lord.

Whithersoever I turn my eyes, I perceive wonders in the works of thy hands. The heavens, and their splendour, exalt thee, O thou Almighty Being!—

Who has suspended the sun in the ether ? Who has called the stars by their name ? Who has prescribed to the wind that measure of power which directs its blowing ? Who has commanded the clouds to let the rain fall upon the earth ? Who opens the bosom of the earth, and renders it fertile in blessings ?—It is thou, O thou strong God, thou God of majesty, whose goodness reaches unto the heavens.

Thou restrainest the fury of the waves ; the thunder obeys thy voice ; thou clothest the trees with smiling verdure, whose tops furnish us with a pleasing shade ; and it is thou who multipliest their shoots. Thou supportest the mountains that they fall not down ; thou hast suspended the earth upon nothing, and thou guidest it by thy hand.

The brightness of the sun, the darkness of the night, and the violence of the tempest, proclaim thy grandeur. All nature invites me to glorify thee : the sand of the sea, the smallest worm, the high mountain, the low valley, and the verdure by which it is ornamented, all cry out, *Give glory to the Creator !*

How innumerable are thy works, O God of strength ! How great art thou even in the smallest objects ! The animal that cannot be seen by the naked eye, has flesh, bones, and nerves : by thee it exists, and its existence is to it a blessing, till the moment thou shalt command an atom to destroy it.

Man is thy image upon earth :—O, how can he be sufficiently grateful for such a favour ! Man, his soul, his senses, his different organs, his all—are a series of wonders ! Capable of being united to thee on earth by the bond of faith : appointed to penetrate one degree further into thy essence ! formed for eternal life !

Hallelujah ! Hallelujah ! the Son of God has redeemed me on Calvary ; he has procured me an everlasting life ! astonishing privilege ! May faith and hope daily increase in me, that I may even now bring forth the fruits of wisdom and love !

Exalt him without end, O my soul, exalt his name ! Let my heavenly Father be glorified ; and may the universe unite with me to

A hymn of praise to the Creator.

praise him ! Let the whole earth fear the Lord ; and let all that have understanding trust in his name, and serve him with fervour ! Who is he that can refuse to pay homage to our God !

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JUNE I.*

DIFFERENCE BETWEEN THE WORKS OF NATURE AND ART.

WHEN we compare the works of nature with those of art, we find that the former have a decided superiority over the latter.—The bare consideration that the works of art are only an *imitation* of those of nature, will put this truth out of doubt. Every artist wishes to approach nature as near as possible ; and only exults when he finds he has, in some sort, attained this end ; though in reality he has fallen far short of it. He is not able to *invent* ; and all that he does is only an imitation of nature. *Nature* is rich and various ; *art* is poor and uniform. In the extensive kingdom of nature, we find an inexhaustible treasure : even one of its parts, a stone, a plant, or an animal, presents us with so many things worthy of our observation, that when we examine the smallest particle with the utmost exactness, we cannot discover the slightest imperfection. The works of art are, on the contrary, soon exhausted. If we examine them with a critical nicety, we soon lose the admiration which their beauties at first view excited, and discover faults and imperfections which we had not before suspected. What are the most celebrated statues, in comparison of a single animal, an insect, or a worm ? Nature is able of herself to produce the greatest masterpieces ; whereas art borrows from her all that it has, which can be called *beautiful*, having nothing of its own. Nature has the first claim on every thing art possesses.

Add to this, that the works of art are far less durable than those of nature. After the former have been long destroyed, the latter continue in all their primitive beauty. But, what advantages have the works of nature in their internal construction over those which proceed from the hands of men ! Let us only compare the most ingenious machine with the mechanism of animals, and we shall be struck with astonishment at the wonders of God in nature, while the masterpiece of art will appear like a child's plaything. Let a man consider himself, with attention : the perfect and regular structure of his muscles and arteries ; the wonderful circulation of the blood in his veins, the number and variety of the motions of his members ; and what proofs do they afford of the magnificence of the Creator's works, in comparison of which the most perfect works of man are trifling and imperfect !

It would be easy to extend these observations, were not the little we have said sufficient to teach us how to appreciate the works of nature. It is true, that our self-love leads us to prefer our own works to those of all others ; and our taste is so depraved, that we consider

 Difference between the works of nature and art.

with indifference, and often with disdain, whatever human industry has not produced. Both these prove our ignorance and ingratitude. Would it not be very unjust to set less value on a watch, admirably executed by the hand of a great artist, than on a snowball formed by the hand of a child? In thus depriving the excellent workman of his due honour, should we not, at the same time, show our stupidity and folly? This is exactly our case, when we do not properly appreciate the works of nature and art, and do not give them their due. However, we should not despise the productions of *art*: they have their value; but it would be absurd to consider them as equal, and still more so, to prefer them to the works of nature, which are infinitely superior to them.

Now, if God have given such perfection to his works, is it not that we should acknowledge his power, wisdom, and goodness in them, and render him that glory which is his due? In order to fulfil this duty, let us carefully examine and contemplate nature; and let us never forget the end that we should propose to ourselves in this research. Let the study of nature be our delight, seeing it may teach us to know more and more of the Creator and Governor of the world: and let us continually feel, and earnestly desire to be properly fitted for that place, in which we shall have a more perfect knowledge of his works than that which we can acquire in this lower world.

 JUNE II.

THE LEAVES OF TREES.

LEAVES, the ornament of trees, are one of the greatest beauties of nature. Our impatience to see them bud in the spring, and our joy when they appear, sufficiently show that we consider them the ornament of our gardens, fields and woods. How great is the pleasure which we enjoy in the scorching days of summer, by the refreshing coolness of their shade! Yet this is but the least advantage which results to us from the leaves of trees. We have only to consider the wonderful structure of leaves, to be convinced that they are designed to serve more important purposes. Take the trouble only to examine the first you meet with. Every leaf has certain vessels, which being closely compressed at the end of the stalk, extend themselves like ribs on the anterior part of the leaf, and branch out in various ways. There is no leaf, which has not extremely fine vessels, and an astonishing number of pores. In a species of box, called the *palma cere-ris*, one hundred and seventy-two thousand pores have been counted on one side of a leaf! In the open air, leaves turn their upper part towards the sky; and the under towards the earth, or the interior part of the plant. To what purpose could this particular arrangement be, if leaves were of no other utility than to adorn the trees, and afford us a shade? Certainly the Creator has something more important in view.

The leaves of trees.

The nutrition of plants is carried on particularly by the leaves. Their pores serve to imbibe humidity from the atmosphere ; and to communicate this to the whole plant. How much wisdom appears in this organization ! By this, plants, in the time of drought, do not run the risk of perishing for lack of moisture. They receive a vivifying dew in abundance, which, falling from the upper leaves, drops down on those below, so that nothing is lost of this nutritive juice. Many experiments prove that plants perspire much ; and the leaves are the instruments in this important work. They serve also to introduce into the plant a necessary measure of air : they appear also to contribute to the preservation of the blossom, which is to spring out the following year ; for as the eye of the bud is found already under the leaf, doubtless it is protected and preserved by it ; as well as by the quantity of juice which is collected where the leaf is joined to the plant. Hence it is, that many trees dry up and wither, when their leaves are striped off. This often happens to the mulberry-tree, whose leaves are taken off to feed silk-worms. This also is the cause why grapes never arrive at maturity, when the vine has been stripped of its leaves in the summer.

We may make another observation on this subject, which casts much light on the manner in which plants acquire their gradual growth. The lower surface of leaves, which is turned towards the earth, is always of a paler and less vivid colour, more rough and spongy than the superior surface. Here again we discover the wisest contrivance : the side of the leaf which is towards the earth has more asperities, and consequently, more pores, that it may the more effectually imbibe the dew, which is exhaled from the earth ; and afterward distribute it with more ease and abundance to the whole plant. The leaves, therefore, turn to that part whence they may derive the greater quantity of this nutritive juice. Hence it is also that the leaves of certain plants hang very low. If we observe the trees which grow on a steep mountain, we shall find that the leaves do not take a horizontal direction, but a perpendicular one. This shows that the leaves direct themselves to that quarter whence they may receive most nourishment.

This meditation gives us another opportunity to admire the wisdom of God. We may henceforth consider the leaves of trees in another point of view than we have hitherto done. When we knew not the inimitable art used in their construction ; nor the important ends of their existence ; it is no wonder that we considered them with a negligent and indifferent eye. But now, when we understand that each leaf is a masterpiece of divine wisdom, and an organ of fertility, it would be unpardonable to see the leaves of trees without paying particular attention to them : and the following reflections may naturally spring from the subject :—Every object, even the smallest in nature, has been arranged by the wisdom of the Creator. There is not even a single leaf useless, or which only serves for the ornament of the trees ; each contributes its part to the fertility and support of the

The leaves of trees.

vegetable kingdom. Now, seeing each leaf is a masterpiece of the power of God, what wonders does a single leaf present to our eyes. All the faculties of my soul are not sufficient to comprehend one of these wonders, and the smallest leaf may afford me matter for meditation as long as I breathe.

JUNE III.

THE VIVIFYING POWER OF THE SUN.

I MYSELF feel this vivifying influence. As soon as the sun rises over my head, serenity and joy are diffused through my soul. The light and heat of this luminary communicates that cheerfulness and activity which I so much need, to enable me to fulfil the duties of my vocation, and to enjoy social life. That involuntary gloom and indolence, which rendered me so inactive during the winter, are dissipated by little and little. I respire with ease, and labour with more pleasure. And how can it be otherwise, seeing I am a witness of the universal joy which the sun communicates to the world, and discover every where his reviving power? He animates and revives all creatures by his benign influences. Millions of shining insects awake, collect themselves, and sport in his rays.

Birds salute him with their melodious concerts; all that breathe rejoice at his appearance. Even inanimate creatures experience his cheering influence: every where we perceive blessed effects produced by him. He causes the sap to ascend in the tubes of trees, plants, and vegetables; he causes the leaves to spring out. He forms the fruits, gives them their tints, and brings them to maturity. He spreads light and life through nature. He is the source of that heat which is found in animals; and without which they would sink into insensibility and death. The influence of the sun not only appears on the surface of the globe; but also in the caves and bowels of the earth, where it gives life to animals, and produces metals. He penetrates even the highest mountains, though composed of stones and rocks. He darts his influence even into the depths of the ocean, where he acts in a variety of ways.

When we reflect on these salutary effects of the sun; it is very natural to think on the miserable state in which our globe must be found, if deprived of the light and warmth of this celestial body; without him, what would our globe be but a dull and lifeless mass; without order, and without beauty? The trees could not put forth their leaves; nor the plants their flowers. The meadows would be without verdure; and the fields without crops. All nature would assume a gloomy and mournful aspect. Is not this a striking picture of the state in which the earth would be found, were it deprived of the vivifying grace of Christ? Had he not, by his doctrine, diffused, light and consolation through the world, we should have all lain buried in

The vivifying power of the sun.

the night of ignorance and despair. If his powerful grace do not animate us, can we bring forth the fruits of righteousness and piety? The tares of vice would spring up every where, without obstacle, and choke all the seeds of virtue. Where could we have found hope, consolation, and happiness, if Jesus had not procured them for us by his blessed advent? Sitting in the valley of the shadow of death, and laden with chains, we should have groaned in vain for deliverance: neither cure nor comfort could have been elsewhere procured. How just is it then, that our hearts should expand with the purest joy, and exult with triumph, when we reflect on the precious blessings purchased for us by the Sun of Righteousness! If the Creator of that luminary which presides over the day, were not my reconciled Father, I could not contemplate the natural sun with that transport which I now feel, in consequence of knowing that Jesus Christ has made my peace with God.

The sun in his vivifying influence is an emblem of a Christian, whom genuine love inspires. He also spreads joy and blessings around him. By him the weak are strengthened, the afflicted comforted, the ignorant instructed, and the poor relieved. May we henceforth resemble this loving, beneficent man! Let us, in that sphere in which we are placed, scatter among our brethren the blessings with which Providence has favoured us. Without self-interest, and without partiality, let us extend the hand of succour to all those who are in need. Let us instruct, comfort, nourish, and support all we can. Thus, we shall leave this world loved and regretted by our brethren; and those that remain shall call us *blessed*.

JUNE IV.

THE DESIRES OF THE SOUL ARE INFINITE.

LET us employ a few moments in reflecting on ourselves. Our soul has undoubtedly the first claim to our attention: it concerns us more than any thing else; and should be more dear than all those objects which give us pleasure at this season. Whatever satisfaction we may find in meditating upon the corporeal world, is not to be compared to what we may feel in meditating on the nature and faculties of our souls. The contemplation of earthly objects, which the traveller meets with on his way, is doubtless pleasing to him; because he requires recreation and amusement in his pilgrimage: but that of spiritual objects leads directly to that blessed immortality which genuine Christians expect in the world to come. Let us sometimes reflect on the desires which God has impressed upon our souls. Experience proves, that our thirst for knowledge can never be fully satisfied: as soon as we have made any discovery, we thirst after new information. Our desires are never satisfied: and when we have enjoyed what we most earnestly desired, we begin immediately to form new wishes.

The desires of the soul are infinite.

The desire of receiving greater and more numerous blessings accompanies us through life ; and subsists even in that moment when we are taking our leave of this world.

What conclusion should we draw from this ? Without doubt, we may infer, that as our desires extend always into futurity, without being ever fully gratified, there must be other blessings after death, seeing our desires exceed the limits of this life. Therefore we are not designed for this transient life only, but for one that is permanent and eternal. Can we then suppose, that man should be the only creature upon earth endowed with desires and faculties which can never be gratified ? If man have an instinct which is never to be satisfied, he may be considered as even below the beasts that perish. When a beast hungers or thirsts, he in general finds means to supply his necessities. We see the silkworm spin its cone, and shut itself up in it for its transformation ; this would not take place were there not another state in which it is to appear in a new form. Birds lay eggs ; would this happen were not these eggs designed for the preservation of their species, or that of other creatures ? If then our existence were to be shut up within the narrow bounds of this life, why should we have inclinations and desires which can never be satisfied here below ? Why should we have faculties which can never be of any use to us ?—No. Our heavenly Father could never have endued our souls with these infinite desires to no purpose, much less to make them our tormentors.

Being of beings ! my soul is capable of knowing thee, and of loving thee above all things. It aspires to become like unto thee, and to be reunited to thee for ever : it can rise above every thing that is terrestrial, and soar to thee : is it possible then, that this soul should be annihilated ? Were it to be so, in vain has it learnt to know and love thee, and to aspire after eternal communion with thee. For, how short do we fall of this enjoyment here below ! We know but in part : our love is weak and languid, and our enjoyment of thy grace is still imperfect. Certainly, it is impossible that all my happiness should consist only in this : surely, all the blessings which I possess upon earth, are only the pledges and forerunners of that infinite felicity which awaits me after death.

This explains and reconciles every thing ; and I see clearly into my future destination. I now see, that it is not in vain that I wish to grow in wisdom and holiness, and to come nearer and nearer to God, the source, original, and model of all perfection. I know now, that all the happiness which I could not enjoy here below, or which I have enjoyed only for a short time, shall be my eternal lot, when I shall enter into that new state of existence. I am now certain that those blessed hours in which the love of God filled my whole heart, in which I felt the foretaste of celestial happiness, in which I so ardently aspired after my utmost perfection, were not vain and fruitless : I am now going on to perfection, and I shall arrive at it. I raise my heart to God ; and though it often falls short, yet I know I am getting

The desires of the soul are infinite.

nearer to him : I thirst for the living God : and shall, by and by, arrive in that place of happiness where I shall always behold his face. No holy propensity, no pure desire, no faculty of my soul, is useless. All shall be satisfied, realized, and fully employed in a blessed eternity.

Let us rejoice then, in the immortality of our souls. Though we may appear far from this happiness while in this world ; yet, as it is *certain*, we should rejoice in it : God himself has impressed the idea of eternity upon our minds. Let us not stop at visible, but go on to invisible things. In the midst of all the pleasures which we enjoy here below ; all the hopes which relieve and animate us ; and all the blessings which fall to our lot ; let us aspire after those pleasures, those hopes, those inexpressible blessings, which are reserved for us in a better world. Let us employ those noble faculties of our souls to ascend to heaven ; it is for this end we have received them. Our souls have been created and redeemed for immortality : let us therefore guard against the seductions of sense, and not permit our infinite desires to be buried in transitory things, utterly unworthy of them. In the moderate enjoyment of earthly good we should be grateful : and from it we may and ought to draw this comfortable conclusion : "If we have now so much pleasure and comfort, what abundance shall we enjoy when united to the Lord in the world of spirits! If he be so magnificent in his gifts here below ; what must he be in the kingdom of heaven!"

JUNE V.

THE UTILITY OF RIVERS.

WHEN we calculate the space which rivers occupy, we find they take up a large part of the globe. Some are discontented with this arrangement, and imagine that it would be more advantageous, if there were *fewer rivers*, and *more solid land*. But, if they only considered with what wisdom and proportion the Creator has arranged every thing on our globe ; they would conclude, that rivers have not been distributed on the earth without the wisest intentions, and manifest utility to man and other creatures.

First, we may observe, that river-water furnishes a very wholesome drink for men. Spring, or pump-water, when it has continued a long time under the earth without motion, detaches and carries along with it portions of matter which may be injurious to our bodies : but river-water, which is constantly evaporating, and always in motion, purges itself from all impurities, and becomes, in consequence, the most salubrious drink, both for man and beast. But the usefulness of rivers extends much further. Is it not to them that we owe the neatness, the salubrity, and the comfort of our dwellings, as well as the fertility of our fields ? Our habitations are always unhealthy, when surround-

Utility of rivers.

ed with marshes or stagnant waters ; and when the want of water produces a great drought, the smallest rivulet cools the air round about, and renders it extremely pleasant. It is the same in respect to the fertility of the land : this is commonly owing to the vicinity of rivers. What an astonishing difference is there between a country watered by rivers, and one to which nature has denied this blessing ! The one is a dry barren desert ; the other is, on the contrary, a garden of delights, where the woods, vallies, meadows, and fields, present a thousand beauties, and the most pleasing variety. The winding river is the cause of all the difference between these two countries : it carries refreshment, prosperity, and plenty, wherever it goes. It not only waters the roots of plants ; but fertilizes the earth by its inundations, and continual evaporations. And who can be so inattentive, or rather, so ungrateful, as not to acknowledge how useful rivers are to whole countries and provinces, seeing that from them we daily derive innumerable advantages ? How could commerce be conveniently carried on, if we could not, through the medium of rivers, receive merchandize, and necessary provision from the most distant countries ? Of how many mills and different machines must we be deprived, if they were not put in motion by rivers ? And, of how many kinds of delicate fish must we be wholly destitute, if rivers did not furnish them in such abundance ?

But it may be said, were there no rivers, we should be preserved from those inundations which sometimes do so much damage. I grant, that when they overflow their banks, they may produce much havoc and devastation in flat, level countries : but is this inconvenience such as to prevent rivers from being a blessing of Providence ? Are not the innumerable advantages which we derive from them far superior to the mischief which they may sometimes occasion ? Inundations happen but seldom ; and extend only over a small tract of country. Besides, whatever ravages they may cause in the inundated countries, they ultimately produce much good even in them, by enriching and fertilizing the land : and even these things, to an attentive mind, are a proof, that while God appears to chastise with one hand, he dispenses blessings with the other.

Thus then, rivers and streams should convince us of that Divine goodness which extends over all the earth. We may see that every part of nature, that all the elements, concur to render us happy, and to procure us a thousand conveniencies. If only one of these providential blessings failed us, that privation would destroy a great part of our happiness. If there were no rivers, there could be no fertility ; and the earth itself would become a heap of barren sand. What innumerable multitudes of creatures, which can neither live on the earth nor in the air, must immediately perish, if the powerful hand which created the rivers were to dry them up ! What praise and thanksgivings are due to that bountiful Being, who has produced our rivers and streams ! As often as we enjoy the advantages which these afford, may we bless the name of the Lord, who is the bestower of all good !

JUNE VI.

VARIETY OF FLOWERS.

WE cannot but be struck with astonishment, when we consider the prodigious *number* of flowers produced in spring, summer, and autumn : but the *variety* is still more astonishing than even the prodigious *number*. Certainly, nothing less than unlimited power could produce such a number of creatures : but that power must have been united with infinite wisdom to have produced such *variety*. If flowers perfectly resembled each other in their structure, form, size, and tints ; that uniformity would fatigue our senses : or, if the summer produced no other flowers than those brought forth by spring, we should soon be weary of contemplating them ; and of bestowing on them that care and cultivation which they require.

It is therefore a proof of the Divine goodness, that the productions of the vegetable kingdom are so pleasingly diversified ; and that such a variety of new charms is always added to their perfections. This diversity does not extend merely to whole families in the kingdom of plants, but also to individuals. The *pink* is different from the *rose* ; the *rose* from the *tulip*, the *tulip* from the *auricula* ; and the *auricula* from the *lily* : but each *pink*, *rose*, *tulip*, *lily*, and *auricula*, has its distinct characteristic ; and its peculiar beauties and varieties. Every one has something peculiar to itself. In every bed of tulips, in every rose-bush, there is scarcely a flower that has not some diversity either in the structure, size, or assemblage of colours. Two flowers cannot be met with, the form and shades of which are perfectly alike. All have their *different* ornaments, though of the *same* species.

Take a view of all the flowers which fill the beds of a *parterre* ; some are of an extraordinary size, and seem to reign over all the rest ; others are of a middling size. Some carry their stately tops above the heads of men : others creep on the earth. Some have the most splendid colours ; others are simple in their ornaments, and make no show. Some perfume the air with the most exquisite odours ; while others only please the sight with their beautiful and well-arranged colours. The variety of flowers are not less multiplied with respect to the different seasons. In spring, when men leave the city to contemplate the productions which the bountiful Creator has caused to spring out of the earth for their support, they see the blossoms of the trees in all their pomp, and in all their beauty. Towards summer, when the attention is particularly drawn to the sown ground, thousands of flowers present to his eye the most pleasing sight. The different species succeed each other in a fixed, regular order. When the winter comes, it brings other plants, which, though they may not please the eye, have, nevertheless, their particular use. If we go over the whole scale of vegetables, we shall ever find new and greater varieties. How great a difference, and how many links, do we find

Variety of flowers.

between the grass which grows among stones, and that excellent plant which affords us the best nourishment, and without which we could not well live. What a difference is there between the plants which creep and twine about others ; such as the weak *ivy*, and feeble *vine*, whose grapes afford us such delicious drink ! What difference between trees, from the *hawthorn* to the *oak* !

With what wisdom has God arranged all his works ! This is the most natural conclusion I can draw from these reflections. With what astonishing wisdom and perfection has the whole plan of the vegetable kingdom been executed ? In all his works the *useful* and the *agreeable* have been united. For it was not merely to please our sight that he has formed plants so astonishingly different from each other. There is no month of the year that is not marked with the Divine goodness. Each of these gifts affords our senses new pleasures, and our hearts new motives to extol his tender love. If the proofs of the Divine bounty were more uniform, we should be more excusable for our inattention ; but seeing they are so varied, we are absolutely inexcusable if we behold them with indifference. Shall we any longer render ourselves guilty of an insensibility so criminal ? Let us, in the presence of the magnificent spectacle of creation, encompassed as we are with thousands of creatures which the Almighty Being has formed, adore him with the most profound veneration and respect ! In considering the amazing varieties in the vegetable kingdom, which can we admire most, the *wisdom*, or the *goodness* of God ? Both surpass our comprehension, because they are infinite. Henceforth, let us not behold the diversified beauties of plants and flowers, without adoring our Creator, and exclaiming, How great must thy wisdom, power, and goodness be, O thou Most High God !

JUNE VII.

THE UTILITY OF VENOMOUS PLANTS AND ANIMALS.

EVERY thing on earth, considered separately, is good and wholesome ; and if any thing be found noxious, it is because we make a bad use of it ; or employ it in a different way to what it was designed. Hence it is, that the food which supports the life of one animal, is death to another : and that the same plant, which in certain circumstances, is considered as poisonous, in others is very useful and salutary. For example ; *hemlock* was formerly considered as a mortal poison : but a multitude of experiments have lately proved that admirable cures may be effected by it. The number and variety of vegetables which grow upon the earth is prodigious ; but we must not imagine that they were all created for the use of man.

Some plants are designed for beasts ; others furnish us with clothing and ornaments : some please our taste and smell : multitudes are medicinal ; and would be of the utmost service in a variety of diseases

The utility of venomous plants and animals.

to which men and animals are subject, if they were not adulterated. The same thing may be said of many living creatures ; which, though they may be very dangerous to *us*, are very useful to other animals, either as food or medicine. Birds in general feed on such insects as are commonly reputed noxious. Domestic fowls swallow spiders eagerly ; and *peacocks* and *storks* feed upon all kinds of serpents. If we also consider how many excellent remedies are composed of the most venomous herbs ; nothing can be easier than to vindicate the wisdom and goodness of God, in the formation of creatures, which answer so many purposes.

The following reflections will cast still more light upon this subject. The number of noxious plants and animals is nothing in comparison of that multitude which are manifestly of the utmost utility. Besides, God has planted an instinct, both in men and animals, which induces them to avoid whatever might be prejudicial to them. Mischievous beasts dread man ; and scarcely ever use their natural arms against him, unless they are attacked, or irritated. But this is not all ; the most noxious animals have evident marks and characteristics, by which their dangerous properties are easily known ; so that being apprized of the danger, we may prevent or shun it. The *rattlesnake*, which is the most dangerous of the whole genus of serpents, gives information of its own approach, by the noise made with the rings of its tail. The *crocodile* is very awkward in his motions ; and cannot turn but with difficulty ; hence it is easy to escape him. Add to all this, that the Divine goodness has so ordered matters, that the most dangerous and venomous animals furnish the remedy for their own poison. Thus, the oil of the *scorpion* is an infallible remedy against its stings. A *bee* bruised, and rubbed on the part, cures the wound it has made ; and the fat of *vipers* is an excellent remedy against their bites.

But it may be said, It would be better were there neither noxious plants nor animals upon the earth. Such a thought only shows our ignorance and selfishness. If God has formed a creature which may injure another, it is for the wisest reasons ; and from this arrangement considerable advantages result. Many creatures which appear noxious, are not so in effect, or only in certain respects. Their poison, and the organs which they make use of to inflict wounds, are absolutely necessary for themselves. One example may serve for all the rest. The bee causes pain by its sting ; but take away its sting, and the bee is useless. It is the same throughout all nature ; that which appears noxious, is of real and indispensable use. And why has man the presumption to determine on what is useful or injurious in nature ? Who can assert that it is contrary to the wisdom of God that we should at any time feel pain ? Do not the most disagreeable things often afford us the greatest advantages ? In general it is certain that natural things are only accidentally injurious ; and if we at any time receive damage by them, we may almost constantly attribute it to our own imprudence.

The effluvia of flowers.

JUNE VIII.

THE ODOUR OR EFFLUVIA OF FLOWERS.

A THOUSAND pleasing objects every where surround me. Every thing I see, every thing I hear, all the sensations which smelling or tasting can produce, contribute to my well-being, and augment my comforts. Every thing in nature combines, in these beautiful days, to penetrate my heart with the sweetest and purest delight, and to lead me unto God. Yes, my Creator, every object which presents itself to my imagination, and every blessing thou hast given me to enjoy, invite me to ascend unto thyself. Each blossom is a proof of thy power, the impress of thy being, and a hymn to thy goodness.

But let us confine ourselves at present to the pleasure which we receive from the agreeable and diversified odour of flowers. It would have been a very evident proof of the Divine goodness, to have pleased the eye alone by that wonderful variety which appears in the vegetable kingdom : but God has added the sweetness of the scent to the other charms of flowers. These odours are as various as the flowers themselves ; and though it is impossible to determine in what this difference consists, yet we perceive it, when we pass from one flower to another.

It is also remarkable, that the smell is not too strong to affect the head, or injure the olfactory nerves ; nor too weak to prevent its pleasing effects. The particles which emanate from flowers, are so exceedingly fine and light, and become so greatly diffused, that they can produce no inconvenience. The effluvia from a single grain of amber can perfume a room twenty feet square, and fifteen high. The smell of the *rosemary*, which grows in *Provence*, is perceived at sea at twenty leagues distance.

But how is it that vapours which are exhaled from plants can so easily reach the olfactory nerves ? This must be partly attributed to the structure of the nose. It is composed of two cavities, separated by a partition. These two cavities, or nostrils, unite by degrees ; and terminate in one only, which reaches to the bottom of the throat, where it forms a communication with the mouth. All this cavity is lined with a membrane, which is a contexture of nerves. These all proceed from the brain, through a bone full of holes, which, on this account, is termed the *os cribrosum*, or sieve-like bone. The nostrils being wide at the bottom, and contracting gradually towards the top ; the odorific particles are accumulated towards the top, when the air is drawn in through the nose ; and consequently the nerves are more powerfully affected by them.

By these means we can receive the impression of even the weakest odours. We may observe further, that Divine wisdom has formed bony plates, which stop the upper part of the nose, and have a two-fold use : 1. They prevent injurious substances from entering into the passages of respiration while we sleep ; or when we are in-

 The effluvia of flowers.

capable of guarding against them. 2. They receive and support the ramifications of the olfactory nerves, a great number of the branches and filaments of which are dispersed over those plates : and the nerves come every where in contact with the odorific particles which enter the nose with the air.

Is it not right that we should bless our Creator, and give him thanks for these wise arrangements ? In this beautiful season, we may plainly perceive that the sense of smelling is a real blessing. Were we deprived of it, we should enjoy but one half of the beauties of the vegetable kingdom : but by the advantageous construction of our bodies, two of our senses, *seeing* and *smelling*, experience at the same time the effects of the Divine bounty. Are we duly sensible of, and deeply affected by this kindness ? When we receive the pleasing smell of a pink or a rose, we should reflect on the beneficence of the Lord, who has in this also provided for our happiness. While we walk through this atmosphere of pleasant perfumes, let us lift up our hearts to our heavenly Benefactor—to him who has commanded the flowers to diffuse their balsamic odours, and to him who has so wisely established the mode in which we receive so many pleasing impressions. May we not receive lessons of wisdom from these odoriferous flowers ; which may have considerable influence on our happiness ? Do they not teach us how glorious it is to diffuse around us the odour of good works ; and to join mental beauty to personal accomplishments ?

 JUNE IX.

THE MULTITUDE OF ANIMALS.

NATURALISTS, who have taken the trouble to calculate the gross number of animals on our globe, have found about *four hundred thousand* species. Great as this number may appear, it is far from being exaggerated. There is reason to suppose, that in the known parts of the earth, there are more than 450 different kinds of land animals, 600 of birds, more than 2000 of fish with scales : more than 3000 of shell-fish : and more than 20,000 different species of insects which the naked eye can discover. The insects which belong to the different species of animals, and which amount at least to 100,000 species, are not reckoned in this number. Besides, there is an innumerable multitude of insects which are entirely unknown to us ; we may presume not less than 200,000. But, what shall we say of those innumerable tribes of insects, which live only on plants. *Eighteen thousand* different kinds of plants have already been described ; now suppose we allow only *four* species of animals to a plant, we shall find the number amount to 72,000 !

Such a number of animals living on our globe, will doubtless appear prodigious : but we shall not find it too great, if we believe, with

The multitude of animals.

some naturalists, that the whole immense empire of nature is filled with animated beings.

Very eminent physicians have maintained, that those disorders which are accompanied with blotches and pustules, and even some kinds of fever, are occasioned by animalculæ. It is very likely that the atmosphere is often peopled with animals, the extreme smallness of which prevents them from being discovered. And who can tell, but that tremulous motion which is observed in the air in the summer days, may be occasioned by millions of animals that throng in it? Let us take the first flower that falls in our way; for example, a *daisy* or *rose*, and we shall discover a whole republic of insects, whose form and various motions will amuse us. Is there the smallest corner in nature, where living creatures are not to be found? Nature has produced animals even in others: she has designed that one animal should become a world where others should find their subsistence. The air, the juices of plants and animals, putrid matter, excrements, dung, dry wood, and even the hardest stones, have a kind of vitality, and serve as dwellings for living creatures.

The sea itself seems to be an element composed of animals. The light which is observed on it in the summer nights, is owing to an innumerable multitude of little luminous worms; the particles of which, detached from their bodies and corrupted, continue to shine as the animal did when alive. Multitudes of animalculæ which the eye cannot count, sport in the rays of the sun. And all these innumerable inhabitants of our little globe, are infinitely diversified in their form, organs, members, faculties, and motions. Endeavour, O man, to name all those animals. Endeavour to express, in numbers, the individuals only, of a single species. Endeavour to calculate how many herrings, flies, worms, birds, &c. there are. How could you do it! their number is unknown to you; and though you could know it, it would be impossible for you to express it by figures.

Here we see abundant reason to admire the infinite power of our Creator. Himself alone has produced this amazing multitude of creatures; himself alone preserves and supports them. Let us consider how much food such a number of creatures must require. If they lived only at each other's expense, if they destroyed each other, nature could present us with nothing but a frightful spectacle of murder and carnage. But happily, there is but a small number of carnivorous animals; and they are very useful, because they devour dead carcases, and thus prevent infection; and because they preserve a kind of balance, by preventing the different species from multiplying too fast. Besides, the Creator has wisely designed, that the vegetable kingdom should afford nourishment for all the other animals; and he has assigned to almost every species of beasts a particular sort of plant. That all the different kind of animals might find nourishment proportioned to their numbers, he has assigned them their habitations in different countries of the globe. How exactly also has he measured the ground! One tree is greater than several thousands of plants;

 The multitude of animals.

and yet it occupies only a surface of a few square feet : and a multitude of quadrupeds, birds, and insects, dwell there, and are nourished by it. What concern has the Creator manifested for animals, in surrounding them with a fluid matter suitable to their respective natures ! Two sorts of fluids are designed for these creatures ; the one *air*, the other *water*. All living creatures are distributed through these two elements, except a few amphibious animals, which live partly in both. The bottom of these two fluids is the habitation of one part of these animals : such as reptiles, and the greater part of the quadrupeds, in the upper fluid : and zoophytes, cockles, corals, muscles, &c. in the lower. Others have the power of ascending or descending at pleasure, in the element in which they live : in the air, birds and insects : in the water, whales, and most other fish.

And does the Atheist say in his heart, *There is no God ?* Fool ! go and ask the beasts of the field, and they will teach thee, that He is ; ask the fowls of the air, and they will declare him unto thee : speak to the reptiles of the earth, and they shall show him : and the fish of the sea shall manifest him ! Do they not all proclaim : “ We are all the work of an almighty hand ! ”

 JUNE X.

IMMENSITY OF THE FIRMAMENT.

APPROACH, O man, and contemplate the firmament. Consider that multitude of lamps which illuminate thy nights. Endeavour to count them : thy feeble sight is incapable of doing it : and thy eyes lose themselves in the multitude of stars. Well, then, take thy telescope, and fortify thy eyes with this additional strength. What dost thou now discover ? To the former millions, new millions of worlds are added ! Continue thy observations, and endeavour to count the stars which thou hast discovered. Thy ideas are confounded :—thou seest that no numbers can express this immense multitude.

It is true that, for many ages, men have endeavoured to ascertain the number of the stars ; but the discoveries which have been made in the heavens since the invention of telescopes sufficiently demonstrate that the number of the heavenly bodies cannot be determined. To count the stars is an enterprise as impossible, as to number the grains of sand on the sea shore. Before the invention of telescopes, no such number of stars could have been seen as have since been discovered. One of the most ancient astronomers reckoned only 1026 stars, and this catalogue was afterward increased to 1088. But the observations made since, by means of telescopes, have vastly increased the number ; and proved that it is impossible to discover the whole.

Those instruments have shown us that the long luminous tract which encompasses the whole sky, and is called the *Milky Way*, is composed of an innumerable multitude of stars. We know also, that

in those places where formerly we beheld but a single star, we now discover many with the assistance of even a middling telescope. By these instruments we have discovered in two constellations alone, twice the number of stars which were before seen in the whole heavens. How much are our ideas of the extent of the heavens enlarged by these means!

But, if other discoveries already made, have increased our admiration at the immensity of the Divine power; what must it be, if we consider what vast bodies these stars must be; seeing that notwithstanding their prodigious distance, we can discover many of them with the naked eye. Exact calculations, on which we may depend, teach us, that a cannon-ball, shot from one of the nearest fixed stars, would be more than *seven hundred thousand years* before it could reach our globe. And yet the greatest astronomers agree, that even these numbers do not express the apparent distance of one of the fixed stars from our earth.

Some of these globes appear to us larger than others, because they are nearer to us: and it is on this account that we call them stars of the *first* magnitude. Those nearest to them, stars of the *second* magnitude; because, being much further off than the former, they appear less, and they must be as far from the former as they are from us. Those of the *third* magnitude, must be three times further; those of the *fourth*, four times further off from the first than the first are from us; and so on. Let us suppose that there are only twenty of these different orders, and it will follow, that the diameter of the universe is so great, that a cannon-ball could not traverse it in twenty-four million of years! The distance of the fixed stars is too great to be computed. It has been conjectured that *Sirius*, probably the nearest to us of all the fixed stars, is distant from the earth not less than 32,000,000,000,000, of miles! which is further than a cannon-ball would fly in seven millions of years!

King of heaven! Sovereign Ruler of worlds! Father of angels and men! O that my ideas were as vast and sublime as the extent of the heavens, that I might worthily contemplate thy magnificence! O that I could raise them to those innumerable worlds, where thou dost manifest thy glory even more than on our globe; that as I walk at present from flower to flower, I might then go from star to star, till I came to the august sanctuary where thou sittest upon the throne of thy glory! But my wishes are useless, as long as I am but a traveller on this globe. I cannot fully know the beauty and magnitude of these celestial worlds, till my soul be freed from this gross body. In expectation of this, as long as I shall live, I will lift up my voice, and invite men to celebrate the glory of the Lord.

“Jehovah is omnipotent, and infinitely good; he commands the stars, and they obey his voice, and run the race which his finger has marked out for them. He knows their numbers, and calls them by their names. Filled with the most profound veneration, let us prostrate ourselves, and adore the Lord. Let us celebrate the magnificent

works which his hands have formed.—Who can comprehend the glory of the Most High? Who can form any adequate conceptions of the unlimited power and unbounded wisdom of the great I AM!"

JUNE XI.

PECULIARITIES OF THE VEGETABLE KINGDOM.

THE difference between animals is so great, that at first view it appears difficult to find any similitude between them and plants. Some creatures live only in water; others on the earth, or in the air: and some live either on the land or in the water indifferently. This is literally the case with vegetables. There are plants which live only in earth; others only in water; others which can bear no moisture; others which live equally either in earth or water; and some are found which live in the air.

There is a tree in the island of Japan, which, contrary to the nature of all other trees, to which humidity is necessary, cannot bear it. As soon as it is watered it perishes; and the only way to save it in such a case, from entire destruction, is to cut the root, dry it in the sun, and plant it afterward in a dry and sandy soil. There is a species of *mushroom*, some *mosses*, and other small plants, which float in the air: but, what is most extraordinary, a branch of *rosemary*, which was put into the hand of a dead person (according to the custom of some countries,) took root, and extended its branches to the right and left, that at the end of some years, when the grave was opened, it had covered the whole face of the dead person with its leaves!

The vegetation of the *truffle* is still more singular. This extraordinary production has neither roots, stem, leaves, blossoms, nor even any visible seeds. It draws its nourishment through the pores of its rind. But, how is it produced? And whence comes it that generally there is no other kind of herb in the places where this species of mushroom grows; and that the land is light and full of chinks? This has never been well explained.

There is no plant which can be more fitly compared to amphibious animals, than that species of membraneous moss which is termed the *nostoch*. It is an irregular body, a little transparent, and of a pale green colour: it trembles when it is touched, and easily breaks. It cannot be seen but after rain. It is then found in many places, but especially in uncultivated land, and on sandy roads. This plant may be seen in all seasons, even in the winter; but it is never so abundant as in summer after rain. The most remarkable thing in it is, its speedy growth. It is formed almost in a moment; for when, in summer, walking in a garden, not a trace of it is seen; if there suddenly come a shower of rain, and the same place is visited one hour afterward, the whole walks are nearly covered with it. For a long time it was supposed that the *nostoch* fell from the sky; but at present it is

well known to be a leaf which attracts and imbibes a great deal of moisture. This leaf, which appears to have no root, is in its natural state when well impregnated with water : but a high wind or heat causes the water gradually to evaporate in a few hours ; then the herb contracts, shrinks, and loses its colour and transparency. Hence it is, that it appears to grow so suddenly, and to be produced in a miraculous manner by a shower of rain, for when fresh rain falls upon it, though before dried and invisible, it is re-animated, and appears as at first.

It would be easy to enlarge the list of plants considerably, which bear a resemblance to animals. But there are other singularities in the vegetable world which deserve to be noticed. The whole atmosphere is full of plants, and invisible seeds. Even the largest seeds are dispersed by the wind over all the earth : and as soon as these seeds have been thus carried into places proper for them to grow in, they become plants ; and often so little soil is necessary for this purpose, that we are astonished when they derive that which is necessary for their growth. There are large plants, and even trees, which take root and grow in the clefts of rocks, without the least earth.

Vegetation is sometimes effected with inconceivable speed : this is exemplified in *mushrooms*, and in the common *cresses*, the seed of which, if put into wet linen, becomes a sallad in twenty-four hours. There are plants which seem to have scarcely any degree of life, and yet continue to exist. We often see *willows*, not only hollow and rotten within, but the outer bark of which is so considerably damaged, that scarcely one eighth part remains ; all the stems, worthless as they may appear, bud in the spring, and shoot out into a multitude of branches and leaves. How wonderful is it, that the nutritious juices of plants should not only be furnished by the roots, but also by the leaves, which attract, and in some sort pump in the air ; and that there are plants, the tops of which become the roots, and the roots the tops, if inverted when planted.

How surprising also is the great age, to which trees arrive ! There are *apple trees*, which must be above a thousand years of age ; and if we make a calculation in the gross, of the fruit which such a tree produces annually, we cannot but admire the fertility of a single *pippin*, which might have sufficed to furnish all Europe with trees and fruit of this kind. But we should never have done, should we trace this subject as far as it is possible. All is full of wonders : and every thing leads us to that infinitely perfect Being, whose omnipotence, conjoined with unlimited wisdom and goodness, is continually loading us with blessings and enjoyments, to furnish us with new subjects of admiration and praise.

How ungrateful are we, not to reflect on the miracles of goodness which continually surround us ! Shall we neglect to bless and praise that God who does such great and admirable things before our eyes ! Shall we not sanctify the pleasures which the fields and gardens afford us, in contemplating the wonders of the Lord, in reflecting on

them, and in ascending from the creature to the Creator, from the flower to him who has formed it ? "O Lord ! how great and magnificent are thy works ! What wonders do they all present to my mind ! I contemplate them with astonishment ; I am lost in them ;—they surpass my comprehension ; I cannot fathom them. It is by thy command that the grass grows, that the woods are clothed with verdure ; that the flowers scent and adorn the fields and gardens ; and that the trees lift up their tops to the clouds. The mountain cedars announce thy glory ; and proclaim that thou hast formed them. On whatever side I turn, new wonders strike my eyes. The fields, valleys, mountains, rivers, and seas, all, from the atom to the highest sphere, are full of the goodness of the Lord."

JUNE XII.

MEANS OF HAPPINESS FOUND IN NATURE.

TO be convinced that through all nature every thing tends to the benefit of man, we have only to consider the intimate connexion and relation which subsists between ourselves and natural things. It is true, there are several substances of which, considered relatively to man, we do not see the use ; but we must not conclude from this, that they are really of no advantage. Many things appeared useless to our ancestors, which we find of the utmost utility ; and we may presume, that our posterity will discover many useful things of which we are now ignorant. Let us acknowledge in this the Divine wisdom : it has concealed the true use of many creatures from us, that we may be humble, and feel the limits of our knowledge ; and that our sagacity may be exercised, and be more and more excited to contemplate his works.

Many things in nature are useful to us only in an indirect way. Several animals serve for nourishment to man ; and consequently all that is necessary to support those animals is useful to us. We see that a multitude of creatures serve to nourish others. Small fish are the food of large ones. Many birds live on insects and reptiles : and there are several species of them which live entirely by prey. In this the Divine wisdom is further manifested ; for if all animals were to be nourished by the produce of the fields, there would not be enough left for the support of man ; and what would then be the fruit of his labours ?

I grant there are several creatures, which seem to have been formed only to injure man ; for example, venomous animals. Poison is so hurtful to the human body, that, in general, it occasions a grievous death ; and sometimes its effects are so speedy, that there is no time to apply antidotes. On this account, many animals appear in a disadvantageous point of view : but if we consider them in another

Means of happiness found in nature.

light, we shall discover traces of the goodness of God, and have reason to admire his wisdom. Physicians prepare many excellent medicines which are partly composed of poisonous substances. And can we suppose that man would be more happy, if there were no venomous creatures upon the earth? Was not the very poison which they carry, previously a part of those malignant vapours, which man could not have inspired without injury? In a word, we may confidently assert, that there is nothing on earth really injurious to man, unless he himself make an improper use of it.

But if in the formation of our globe, God has designed our happiness, are we not inexcusable when we thwart his gracious designs, by putting obstacles in the way of our own felicity, instead of labouring with all our might to promote it? God's designs towards us are merciful; but we often render them useless, by a conduct which necessarily makes us unhappy. Let us become wiser in future; and profit by the different means of happiness which God has so abundantly provided us in the kingdom of nature. And as it is impossible for our desires to be completely satisfied with earthly things, let us have recourse to religion, which shall amply compensate us for any defects in nature; and will explain to us a multitude of things which otherwise would appear obscure. Let us gratefully remember, and constantly celebrate the wisdom and goodness of God; and prize the means which he has condescended to employ in order to lead us to felicity.

JUNE XIII.

THE LOADSTONE, OR MAGNET.

OF all the bodies in the mineral kingdom the *loadstone* is the most singular in its properties. It is a ferruginous stone, ordinarily of a dark grey colour; and has the property of attracting iron. This virtue, however, is not equally diffused through the whole stone; but resides chiefly in its two ends, which are termed its *poles*. When this stone is suspended from a thread, and left free, it constantly directs one pole to the north, and the other to the south. This effect is invariably produced, however the stone may be moved, if at last left to itself.

This constant and regular direction of the loadstone, (which is subject only to a very few variations in some particular parts of the globe,) has caused the point that turns to the north to be called the *north pole*; and the opposite point of the same axis, to be termed the *south pole* of the loadstone. These two properties, viz. to attract iron, and to point to the north, it communicates to iron, when rubbed against it. This discovery introduced the magnetic needle; an instrument essentially necessary to navigators in long voyages. This is another proof, that things which appear at first sight to be of little

The loadstone, or magnet.

importance, may become exceedingly useful to the world ; and that in general, the study and knowledge of the magnificent works of the Lord, are infinitely advantageous to the human mind.

These properties of the loadstone, induced naturalists to examine it more closely ; not only to find out the cause of these surprising effects, but also to discover other properties of this stone. They were more successful in the latter respect than in the former. They found that the loadstone did not in all places point exactly to the north ; but that it varied a little, sometimes to the east, sometimes to the west, sometimes more, sometimes less. It was observed also, that its attractive power acted with equal force, when any other body was put between it and the iron ; which might be supposed to prevent this effect. All metals, (iron excepted,) wood, glass, fire, water, men, and other animals, give free passage to the magnetic effluvia ; and do not prevent it from acting sensibly on iron. It has been discovered, that the north pole of one loadstone attracts the south pole of another ; while the north pole repels the north, and the south pole the south. It was supposed that the attractive power might be as equally resident in the iron as in the loadstone, seeing it attracts as strongly as it is attracted. In order to be convinced of this, let a loadstone be suspended at one end of the beam of a balance ; and a weight equal to the loadstone be put at the other. When the beam is in equilibrio, and perfectly motionless, place a piece of iron under it, and the loadstone will be instantly attracted by the iron, and descend towards it. If the iron and loadstone be interchanged, the stone will attract the iron.

However singular these phenomena may appear, which we have already remarked in the loadstone ; there is another circumstance which equally merits our attention ; it is this, that all the efforts, and all the sagacity of philosophers have not been able to discover the cause of these wonderful effects : notwithstanding all their labour and industry the loadstone continues a mystery to the human mind. Should we then be surprised, that in *religion*, which is infinitely elevated above all the objects of our senses, there should be found mysteries which we cannot comprehend here below, the perfect knowledge of which is reserved for the coming world ? Is it to be wondered at, that there should be found some matters in Divine revelation, the reason of which we cannot comprehend ; seeing that in natural things, which we daily see and handle, there are found such a variety of objects, which men of the most distinguished learning and ingenuity confess to be beyond the reach of their understanding ? There are, however, wise fools, who dare to doubt every thing in religion, which *they* cannot comprehend. Were this consequence just, it would be more reasonable to say, “ The loadstone does not attract iron ;—it does not point towards the north :—all that has been said concerning it is false ; for we can neither explain nor comprehend it.”

The loadstone, or magnet.

When natural things are in question, we may say to such sceptics, *come and see* : but the mysteries of religion are only to be seen by the eye of the mind. The soul alone can perceive them ; and it shall comprehend them perfectly, when it gets into the light of eternity. Let us patiently wait for this happy period : and, if we find both in nature and in religion, things obscure and inexplicable, let us remember, that the imperfect state both of our bodies and souls, renders it impossible for us to explain them in this world ; and let us remember also, that a considerable part of our felicity in the world to come, will consist in having a more perfect knowledge of every thing that can contribute to our happiness, and manifest the glorious attributes of the Supreme Being. “ There, in the fountain of light we shall have a clear and distinct view of every thing that appeared obscure in this world. There, we shall discover the most admirable wisdom, in all that appeared defective to us here below. There, our souls, filled with gratitude and joy, shall see the whole, together with the different parts, connexions, relations, and marvellous harmony of the works of God ! ”

JUNE XIV.

CHERRIES.

CHERRIES are a fruit which, by their sweetness, tempered with a pleasing acidity, quench our thirst, allay the fever of the blood, occasioned by the heats of summer, and prevent that putrescency, to which the various humours are particularly disposed, during this season. In the first place, they quench thirst by their sharpness ; which causes the salivary glands to contract ; they cool the parched tongue, and moisten the dry palate. This mode of quenching thirst, during the hot season, is preferable to those drinks, with which we overload our stomachs ; and which only tend to increase the perspiration, and augment the heat of the system. But, besides this property of quenching thirst in the most pleasing manner, they have a cooling quality, which moderates the heat of the blood ; and, according to some naturalists, calms that impetuosity of the animal spirits, which, causing too great an agitation, affects and enfeebles the nerves. Thus, the wholesome juice of cherries, by its acidity and astringent virtue, cools us delightfully in the excessive heats ; prevents the blood from becoming too thin, thickens the fluids, and preserves them from putrefaction.

With what goodness has the Creator provided fruit proper to each season ! In this hot month we need acid and cooling fruits ; and he furnishes them in abundance. He gives us fruits which are both pleasant and wholesome ; so that while our taste is pleased, our health is promoted. He gives them also in such quantities, that the poor may

Cherries.

enjoy them as well as the rich. Let us, as often as we see a cherry-tree laden with fruit, make this consolatory reflection. How uncomfortable must the lot of the labourer be, who earns his bread by the sweat of his brow, if to cool himself he required those delicious and expensive beverages, reserved for the great and rich ; and which it is out of *his* power to procure ! Merciful Father, thou forgettest not the indigent, thou providest for their necessities ; thou condescendest to refresh them with fruit which thy kind providence has placed within their reach ; and which is as wholesome for them, as the most delicious wine for the rich. What an abundance of acid and cooling fruits are in this season ! Our gooseberries, currants, cucumbers, stone fruits, and sallads, are so many pleasing preservatives of health.

When we behold the fruit trees, and enjoy their fruits ; let us acknowledge and bless the bounty of our Creator, and indulge those reflections which naturally spring from the subject. The heavens and the earth, the elements, and all creatures concur to our well-being. "On all sides we are encompassed with the blessings of our Heavenly Father. Animals, corn, vegetables, and fruits ; in the vallies, on the mountains, in the forests, and in the seas, all minister to our pleasure and subsistence. The kind hand of God is ever open in our behalf." How great are the blessings which God continually heaps upon us ! And how many incitements have we to lift up our hearts to him, and render him thanks for his mercies ! May we never more let any occasion of this kind slip by, without improving it ! When we walk in the gardens, or in the fields ; when our senses are regaled with the beauties and blessings of nature, let us think of *him*, who is the source of all good, and of all delight. Without God, (supposing even that we could exist independently of him,) we could not contemplate nature with so much ecstasy ; and were it not for his continual energy, even in the midst of abundance, we could neither quench our thirst, nor satisfy any of our desires.



JUNE XV.

THE WISDOM OBSERVABLE IN THE CONSTRUCTION OF ANIMAL BODIES.

THE formation of the animal body, furnishes the most convincing proofs of the divine wisdom : for as some animals must dwell chiefly in the air, others on the earth, and others in the waters, it was necessary that their structure should be conformed and appropriated to their place of residence, and their different modes of existence. This God has done with such wisdom as cannot be sufficiently admired. Every thing is disposed precisely in that way, which the necessities of each animal required : and had the construction of any one been at all different from what it is, that creature must have suffered by it considerably, and could not have fulfilled the end for which it was created.

The wisdom observable in the construction of animal bodies.

Birds of prey are provided with nails, strong claws, and sharp crooked beaks, that they may the more easily catch, and securely hold their prey. Those which are to seek their nourishment in marshy places, have need of long legs, and a long slender bill : and it was necessary, that those which live in the water, should have the lower part of the body, broad, a long neck, membranes connecting the toes, to serve as kind of oars, and a certain oiliness in their feathers, to enable them to glide along more smoothly.

Insects that live on prey, have mouths shaped like pincers ; and those who are nourished by suckling, are provided with a sting or trunk. Why have *hares* and *rabbits* such protuberant eyes, but that they may the more easily see, and avoid the dangers and snares to which they are exposed ? Why are the eyes of the *mole* so small and deeply sunk in the head, but because it was designed to live under the ground, and consequently needed little light ; and because prominent eyes would incommode it, and hinder it from burrowing.

Why is the crystalline humour of the eyes of fish so spherical ; but to compensate for the great refraction of the rays of light ; whereas animals that live in the air, have their crystalline in a plano-convex form ? Why is it that animals, whose eyes are moveable, have only two ; while on the contrary, those whose eyes are immoveable, have many ? Why is it that animals which seek their prey by night, have a large and brilliant pupil ? Why is it that the eye of the *hen* answers the double purpose of a telescope or microscope ; but that she may be able to see the smallest seeds in the earth, and among the gravel : and that she may be able to discover birds of prey at a distance, which are coming to seize her young ?

We cannot but be struck with astonishment, when we consider the vast apparatus of the organs of animals necessary to their different motions. What a multitude of limbs ! What pliability ! What activity ! What a profusion of muscles, nerves, bones, and cartilages these various motions require ! Some animals move slowly, others swiftly. Some have two feet, others more ; some have both feet and wings ; others neither. The quickness or slowness of the motions is always regulated according to the necessities of each animal. Those which are well armed, and have courage, strength, and skill, to defend themselves against their enemies, move more slowly than those which are deprived of these means of defence. Who gave to *serpents*, and other reptiles, the power to contract and distend their bodies ; to coil themselves into a circle, and to dart from place to place, so that they may the more easily seize their prey ? Who has so formed the *fish*, that by means of their *air-bladder*, they can ascend or descend in the water at pleasure ? Who has taught the *snail* to contract its body, and bring water into its little dwelling, when it wishes to fall on the ground ?

What art is manifest in the formation of *birds*, in every part of their bodies ; but particularly in their wings ? How well is their bodies fitted for flight ! Small and sharp before. and gradually increa-

sing till they have acquired their proper size ; thus they are well adapted for cutting the air, and making themselves a passage through that element. The feathers are all arranged with exquisite art ; the one lying on the other in a regular order, to facilitate the motion of the body, and to serve at the same time for a covering against the severity of the cold, and bad weather. Although close and strongly braced together, they can extend, erect themselves, swell out, and acquire a larger bulk, according as the necessities of the bird may require.

The *wings*, which are the great instruments of flying, are situated in the most proper place to hold the body exactly balanced in a fluid so subtle as the air. What admirable work do we find in each feather ! The *quill* is extremely stiff, and it is hollow towards the end ; which construction, renders it at once both strong and light. The *beard* of feathers is regularly arranged, narrow on one side, and broad on the other, which is of wonderful use in the progressive motion of birds, as well as in the strong texture of the wings. What proportion do we see in the manner in which the feathers are placed ! They are always placed in such an order, as exactly to agree with the length and strength of each feather ; and the larger serve for supports to the smaller.

In the bony parts of the wings, what a multitude of joints are there which open, shut, and move as necessity requires ; whether for the extension of the wings, or to bring them close to the body ! What extraordinary strength in the *pectoral muscles*, that the bird may pass through the air with the greater rapidity ! What incomparable art in the construction of the *tail* ; which serves as a helm to direct the flight, and assist the birds to ascend or descend in the air, and keeps the body and wings properly poised ! How well are the *limbs* and *feet* appropriated to their different motions ! In some birds the toes are large, and furnished with membranes that extend or contract for the purpose of swimming. In others, the claws are sharp and crooked at the points, that they may walk the more firmly, perch, seize and hold their prey. In some, the legs are long that they may walk in the waters, and rake up their food out of wet and marshy places : in others, they are shorter, but always adapted to their necessities and mode of life.

Who can help acknowledging in this, the supreme wisdom of our Creator and Benefactor ! Is it possible that things so wonderful, so regular, so admirably proportioned, can be the effect of chance ? Can any person persuade himself, that such an innumerable multitude of veins, muscles, joints, &c. could be put in motion in each animal ; and that every part, even to the most minute, should stand in so strict a relation to others, and all fulfil their different functions with such perfect regularity and harmony without design ? On the contrary, should not that which we discover of the structure and arrangement of the animal body, excite us to meditate on the Creator of all things,

The wisdom observable in the construction of animal bodies.

whose wisdom and goodness have placed so many creatures, exactly in the circumstances which were most proper for them ?

Let us, therefore, make use of all these things to glorify our Creator ; and let us seek true wisdom by endeavouring to acquaint ourselves more and more with this Supreme Being, who is not far from any one of us ; and who is so gloriously manifested in all the works which his hands have formed.

JUNE XVI.

THE DEW.

THE wise Governor of nature, who watches continually over his children, and provides for all their wants, makes use of more means than one for fertilizing the earth. Sometimes he effects this by inundations :—and it is true, that when these lay the country waste, the labourer, who is concerned only about the present, often gives way to ungrateful murmurs ; but, if their consequences be properly considered, we shall find that they are very advantageous, and promote the general good. Sometimes it is by a river, which, like the Nile in Egypt, has the remarkable property of passing its banks at certain periods, and overflowing a country, in which it never rains. At other times, he effects this by showers, which occur more or less frequently to cool the air, to moderate the heats of summer, and to water the thirsty land. But the most common means of watering the earth are not always sufficient : the most certain, the most general, and that to which men attend least, and esteem least, is the *dew*. This inestimable gift of heaven, which even in years of the greatest drought, supports and preserves plants from perishing, is those sparkling drops which are seen in such profusion morning and evening, on the leaves of trees and on plants.

The dew does not fall from above, as was formerly imagined ; it does not descend from any elevated regions of our atmosphere ; much less is it the sweat of stars, as superstition has supposed. This pretended celestial origin has probably given rise to the folly of some alchymists, who have thought to convert dew into gold. At present, it is generally agreed, that dew is nothing else than the sweat of plants, and the humidity which is exhaled from the earth. To be convinced of this, we have only to cover a plant with a glass bell, and we shall find that the leaves have collected a larger quantity of dew drops during the night, than the leaves of other plants, which have been exposed to the open air. This certainly could not happen, if the dew fell from above ; and if it did not rise from the ground.

Nothing can be more easily comprehended than the manner in which this is formed ; for no person is ignorant, that the rays of the sun, and the heat which is diffused upon the earth, continually detach

The dew.

from all bodies a multitude of small particles, some of which rise into the atmosphere, and others are collected in the form of drops of water. This origin of the dew explains why it is sometimes noxious, at others not so ; its nature always depending on the quality of the vapours of which it is composed. The wind carries away the light exhalations as soon as they are formed, and prevents them from collecting into drops : hence it is, that the dew is most abundant when the air is calm. By this wise arrangement of the Creator, plants may vegetate and grow, even in those countries where there is no rain : for the soil in those places being sandy, porous, and very moist below, the heat draws up a vast quantity of dew, which encompasses the plants, and supplies the want of rain.

These different means which the Divine Providence uses to moisten and fertilize the earth, should remind us of those which Divine Grace employs to improve the barren hearts of men ; and to make them fruitful in good works. Chastisements, more or less severe, blessings of all kinds, exhortations, warnings given us by the example of others ; and a thousand other means, are employed by the Lord to bring us into a blessed union with himself : to sanctify, and excite us to bring forth the fruits of righteousness and true holiness. Sometimes in nature, a violent storm falls from the clouds, deluges the fields, causes rivers and brooks to overflow their banks, and sweeps every thing away. At other times, God calls the sweet dew from the earth, and hears, so to speak, in secret, the wishes of the husbandman for rain. Thus also in the economy of grace, he uses different means to accomplish the merciful end he proposes. To many hardened hearts he is obliged to speak in thunder and in lightning, as formerly from mount Sinai. Means less terrible are employed to influence and save others. With a gentle, loving, and persuasive voice, God calls them to himself ; he awakens their consciences, and restores their souls by the beneficent dew of his grace.

Let this conduct of our heavenly Father be a model to us. Let us use all kinds of means to reclaim and amend our neighbour ; but especially, let us endeavour, after the example of God, to gain him rather by kindness than by punishments. Let us particularly imitate the kindness of the Lord. We see how he refreshes the parched earth by the dew, and gives fresh life and vigour to plants. Let us think how many of our fellow-creatures are in distress ; and are languishing for lack of succour. Let us not suffer them to implore our aid in vain ; or to perish for lack of assistance. Let us endeavour to comfort their hearts by kindness ; and pour as many blessings on our brethren as the *dew* sheds on the plants.

JUNE XVII.

LIFE AND LABOURS OF THE BEE.

IN the fine days of the present season, these days of joy and gladness, all is in motion, all is full of activity and life in the animal kingdom : but there are no creatures whose activity is so advantageous to us as the little republic of bees. At least it is certain, that of all the insects which surround us, there are none more worthy of our observation, or which can present us with a more pleasing and profitable scene.

Bees in general dwell in great multitudes, either in hollow trees, or such like cavities ; or in that species of basket which we call hives. They fly to the environs, disperse themselves on all sides, and by means of their trunk, collect honey and wax from the juice and stamina of flowers. What they gather, they bring to their dwelling, which they fill from top to bottom with hexagonal cells. In some of these cells they reside ; others are destined to receive the eggs, and lodge their young. And lastly, others are the magazines where they deposit the honey which is to support them during the winter.

Among those bees which form but one family, there is one greater than the rest, a female ; and who is, on this account, called their *queen*. To her alone all the young in one hive are indebted for their existence. From the eggs which she deposits in the cells, little worms are produced, which the working bees feed for some time with their trunks. Afterward these worms remain about fifteen days in their cells, which are closed with a covering of wax, without any motion, and apparently dead. In this quiescent state they are called *nymphæ*. When the time is come, they open their cells, and come out in the form of young bees. Besides the *queen*, there are two other kinds of bees found in each hive ; the *working* bee, and the *drone*. The drones are males ; they impregnate the queen, and serve as her guard. Bees have on their heads two antennæ or horns, which defend their eyes, and give them notice of danger. They have fangs or claws, which they use in their work ; a trunk or hollow tube, which they can thrust out, or draw into its sheath at pleasure. This instrument, pliable and moveable every way, reaches to the bottom of the cup of flowers, to collect the honey ; which passes through the trunk to the honey bag, placed within their bodies ; whence it is afterward poured out into the cells.

Bees have six feet : with the two foremost, and their fangs, they form the wax, which is the *farina* or meal of flowers, into little balls ; and with their middle feet they place these in little spoon-like hollows in their hinder legs : these legs are garnished with hair to retain the wax, that it may not fall off when they fly. Thus laden with honey and wax, the working bees return to their hives, without ever missing their way, though they sometimes go to twenty miles distance. When they arrive, they find other bees, which are in waiting

to assist them to unlade their burthen ; and then they all labour together to employ these provisions to the general good of the hive. With the wax they stop up the crevices of their dwellings, to prevent any other animals from entering ; leaving only such openings as are necessary for themselves. The queen and the working bees have at the extremity of their bodies a sting, enclosed in a sheath, which they use to wound and slay their enemies ; but the wound which they make is generally fatal to themselves, when the sting remains behind.

Every thing in these little animals should excite our wonder. The construction of their limbs, so regular and so well adapted to their mode of life : the care which they take of their young ; the art with which they build their cells ; their activity, industry, and intelligence. Let us never pass a bee-hive with indifference, and without reflection. Let us at least admire them ; and that admiration may lead us to sublime thoughts. If we wish to meditate on our Creator, we shall find him here : this interesting spectacle may lead us to him ; and cause us to adore his wisdom, power, and goodness, in the production of these little creatures.

JUNE XVIII.

THE EXTERNAL PARTS OF PLANTS.

IN order to form a proper idea of the inimitable art visible in the vegetable kingdom, we must proceed by degrees. Our understanding is too limited to be able to take in the whole at one view ; or indeed to acquire a perfect knowledge of it here below. We must content ourselves with a few observations, and pass progressively from visible to invisible things : from simple to compound objects, and from species to genus. Who can at one glance comprehend the whole of the organization of plants ? Let us begin then with observing their external parts ; and first consider their *roots*. These are so constructed, that by means of the *tap*, or principal root, (with the fibres and small roots which proceed from it,) the plant is firmly fixed in the earth. The pores of the root serve to imbibe the aqueous and nutritious juices which the earth contains.

From the root grows the *stem*, to which the plant owes, in a considerable degree, its strength and beauty. The structure of this is varied according to the nature of the plant. In some, the *stem* is in the form of a tube, fortified by different knots, arranged with great skill. In others, the stalk is so weak, that it has need of support, round which it may twine, and fasten itself by means of little hooks, which proceed from it. In others, the stem rises majestically like a strong pillar, becomes the ornament of the forests, and seems to defy the winds and tempests.

The *boughs* extend themselves like the human arms, and are very regularly distributed. These grow wider, and divide themselves

 The external parts of plants.

into small *branches*, which are arranged collaterally like the large boughs. The *buds*, or buttons, which proceed from the branches, are no other than small plants, which being put in the earth, take root, and become exactly similar to the tree in which they first grew.

The *leaves*, that lovely, pleasing ornament of plants, are placed regularly round the stalks and branches. Among a thousand plants, we can scarcely find two leaves that exactly resemble each other. Each has a different structure, a different outline, a different size, and different ornaments. The *leaves* are either simple, or compound; hairy, or of a fleshy substance; smooth, indented, or curled. The *blossoms* of trees, whose beautiful enamel makes one of the greatest beauties of nature, are not less diversified than the leaves. Some are plain, and have but one flower: and others have several. Here we see a vase opening gracefully: there, we see some in the forms of helmets, bells, butterflies, stars, and suns.—Some leaves, or *petals*, are placed artlessly round the plant, others seem to form spheres, garlands, nosegays, &c. From the centre of the flower rises a little pillar, (often several) which is hollow within, round, and sometimes pointed at the top: these are termed *pistils*. Around these are other pillars, much smaller, which are called *stamina*, and which support the *heads*. These are a sort of pendants, or capsules, full of very fine powder.

But who can describe the delicate texture of different flowers; the sweetness of their perfume, the sprightliness, variety, and splendour of their colours?—After the blossoms come the *fruits* and *seeds*; which repair the waste of the seasons, and supply men and animals with food.

The *seeds* and *fruit* enclose under one or several skins or coats the germs of future plants. The external form of fruits and seeds vary as much as that of the leaves and blossoms. There is scarcely any sort of form but may be distinguished in one or other of them.

All these parts of plants have their proper use and design. Let one of the least be removed, and the plant loses a part of its perfection: its beauty, growth, or increase, must be injured by it. However extraordinary it may appear to us, it is certain, that each of these parts is necessary to the perfection of the whole. Make an experiment: strip a tree of its leaves, and it will soon wither and die away. It is the same with all the other parts; there is none superfluous, none useless, none that does not manifestly conduce to the perfection of the rest.

But in discovering these relations, this harmony and wonderful arrangement of every thing in the vegetable kingdom; in seeing that the whole is beautiful, and regulated by general laws variously applied, shall we not conclude, that the Author of all these beauties is infinite in wisdom? This consequence is as natural as that which we draw, when, in hearing a person speak, we conclude he is near us. Let us, therefore, raise our souls to the Creator of all things: in every thing we may see and acknowledge him. It is for this purpose

The external parts of plants.

that he has formed plants with so much magnificence ; and that he displays to our eyes their beauty and utility. Let the divine wisdom be ever present with us ! It will discover itself in the smallest spire of grass, if we take the trouble to examine it attentively. Such reflections will render us more sensible of the pleasures of summer ; and render it still more glorious in our eyes. The more we accustom ourselves to meditate on the works of God, the greater satisfaction we shall find. At the sight of every flower we may exclaim with transport :—How great is our Creator ! How admirable is his wisdom !

JUNE XIX.

A HYMN OF THANKSGIVING FOR THE WORKS OF CREATION.

TO thee, O Lord, from whom all blessings proceed, and who dispensest them with a liberal hand, to thee belong glory, honour, and thanksgiving. Thou hearest the cries of the young raven, and art pleased with the hymn of the lark : deign also to listen to my songs ; and let the just tribute of my praise be pleasing to thee.

The least creature formed by thy hands, displays thy wisdom. The traces of thy power and goodness are seen from one end of the year to the other ; and thou renewest them continually. Every spire of grass proclaims to me thy majesty, and my own meanness.

With the tenderness of a father, thou providest for the necessities of men and animals : thou givest them the nourishment that is proper for them. From one morning unto another, thy blessings come in continual succession ; even the wicked taste thy goodness. O God, who is like unto thee !

The earth is full of thy wisdom and goodness : teach me, O Lord, to praise thee in a becoming manner ; incline my heart to love thee ; and henceforth may I live only to thee, who loadest me with thy blessings !

It is in thy name, and in hope of thy blessing, that the husbandman commits his corn to the furrow. It is thou who formest the seed, and enduest it with fertility. The earth on which the curse rested because of sin, blessed anew by its Creator, now brings forth an abundance of fruit.

Thou fertilizest the bosom of the earth ; thou waterest the furrows of the field ; thou adornest the meadows, the vallies, and the plains, with flowers, thickets, trees, and herbage : thou commandest the cooling and beneficent dew to revive our gardens and fields, and to shed on them fertility and abundance.

The dry and thirsty land thou waterest with thy gracious showers. Thou warmest the cold and damp places with the rays of thy sun. In wisdom thou appointest the times and the seasons, that they may be advantageous to the children of men. So that amidst all the vicis-

A hymn of thanksgiving for the works of creation.

situdes of heat and cold, rain and drought, we see the food which thy bounty has designed for us, spring up, grow, and ripen.

Thou coverest our fields with abundant crops : the wings of the wind support the waving corn : thou adornest the tops of the barren rocks with grapes ; thou deckest our pasture grounds with clover ; at thy command the brooks and fountains refresh the thirsty animals.

Thou causest the tree to take root, and prosper. Thou makest the life-giving sap to circulate in its stem and branches : thou givest it power to shoot forth buds, leaves, and blossoms : and the abundant fruit, by which the branches are bent, proves how much thou delightest to do good.

O come, and give glory to our Creator and Benefactor ; bless his name, and celebrate his bounty with transports of joy ! Great is the Lord our God : all his works are holy and marvellous ! Come, and let us exalt his power : the Lord is good : it becometh the righteous to publish his praise.

JUNE XX.

CATERPILLARS.

THOUGH these insects are so disagreeable to the lovers of gardens, and so disgusting to some nice and delicate people, they also merit our attention. Caterpillars generally live on our trees ; and we feel such hatred to them, that we endeavour to destroy them wherever we meet them. Hence it is, that we do not condescend to honour them with an attentive look, and still less to examine them with any attention. Nevertheless, we may confidently assert, that even these insects may agreeably amuse an attentive observer of the works of God. Let us endeavour to make the trial : perhaps it may excite the curiosity of the reader, and induce him not to trample under foot this insect, till he has observed its wonderful structure, and taken occasion from it to ascend to his Creator.

There are more than 300 species of this animal already known ; and new ones are daily discovered. Their shape, colour, form, propensities, and modes of life, all vary in the different species ; but they have this in common, that they are composed of many rings, which, by dilating and contracting, draw the animal along wherever it goes. Nature has given them two kinds of feet, which have their particular use. The six fore feet are a kind of hooks, which they use to take fast hold of objects, and cling to them. The sole of the hinder feet is broad, and armed with small pointed nails. With the hooks they lay hold on the leaves and grass, and other nourishment ; and by these fix the forepart of the body, till they have drawn up the hinder part. The hind feet they use to keep themselves firm, and to grasp whatever serves them as a resting place. When they are on a twig or leaf, they can seize another at some distance ; for hooking the

Caterpillars.

hinder feet fast, they raise up the forepart of their bodies, poise it in the air, and turn about on all sides ; reach considerably forward on the leaf that is to be their next food, and hold themselves fast to it by means of their hooks. However well adapted the body of the caterpillar is to its necessities, it is nevertheless remarkable, that its state is but transitory ; that their limbs last only a certain time, and that by and by this creeping worm will become a *chrysalis*, without feet or motion, until it be metamorphosed into a creature which appertains to those classes which inhabit the air.

Were it only on this account, the caterpillars merit our attention. Towards the end of the summer, and often sooner, after being satiated with verdure, and having changed their skins often, they cease to eat, and begin to build a house, in which they may leave the caterpillar state, and transform themselves into butterflies. This house, which is called the *chrysalis*, is of an oval form ; towards the end are rings, which grow less and less, till they terminate in a point. The *chrysalis* is full of a sort of pap, which serves for nourishment to the butterfly till the time it comes out. When it is completely formed, when all its members have acquired their proper consistence ; and when a gentle warmth invites them to abandon their prisons ; they make a passage through the largest end, which is at the same time the thinnest part of the *chrysalis*. Its head, which was always turned towards this end, is first disengaged ; the antennæ, or horns, lengthen, the feet and wings expand, and the animal gives a spring and flies away. It retains nothing of its first state : the caterpillar, which was changed into a *chrysalis* ; and the *chrysalis*, which became a butterfly, are widely different animals. The first was downy, prickly, and often of a hideous aspect ; the latter is decorated with the most vivid colours. The first was contented with gross nourishment ; the latter goes from flower to flower, and roams at large over all nature, of which itself is an ornament.

May not this description reconcile every person to these insects, and abolish that hatred which is generally felt towards them ? Perhaps some may think they still have a right to ask, "After all, of what use are these animals : and would it not be better to be entirely freed from them ?" No, certainly : on the contrary, we may rest assured, that the world would be less perfect than it is, were there no caterpillars. Destroy these insects, and you deprive the birds of a considerable part of their food. Now, as the birds are to feed on caterpillars, it was right that the Creator should assign leaves and herbs to these insects, to which they have an equal right with us. It is true, that these animals, by their voracity, often become troublesome to men ; but this is an evil which, in much wisdom, the Creator permits : for the ravages and desolations which caterpillars often make, should tend to humble us, and to remind us of the transitoriness of our earthly possessions. And, suppose we could not comprehend the reasons why God formed such creatures, we could not, on this ground, assert they were useless. On the contrary, we

should take occasion from this, to acknowledge our own ignorance ; and render him the glory which is due to his name.

JUNE XXI.

THE BEGINNING OF SUMMER.

SUMMER begins this day. Many of us have often seen the changes which this day causes through all nature ; but, do we know why the sun remains so long above the horizon : why this is the longest day of the year ; how it comes that, reckoning from this day to the end of autumn, we perceive the heat and length of the days diminish in the same proportions ? All these changes proceed from the annual revolutions of our globe round the sun. When the sun is in *Cancer*, the earth is so situated, that the whole of its northern pole is turned towards the sun ; because the Creator has inclined the axis of our earth towards the north ; and it preserves this direction invariably. On this inclination, and the parallelism of the earth's axis, the changes of the four seasons of the year, properly speaking, depend.

Let us stop here a moment, and consider the goodness and wisdom of God manifested in this inclination of the axis of the earth. If the direction of this axis were perpendicular, our globe would be a melancholy habitation, both for animals and plants. Neither the increase nor decrease of the days, nor any difference of seasons, could possibly take place. How much then to be pitied would the inhabitants of the north be ! The air which they respire would be always as keen as that of March and September ; and, with the exception of a little moss and grass, the soil would produce no fruit. In a word, the greater part of the two hemispheres would be only a dreary desert, the habitation only of a few insects.

At present, nature has nearly finished her annual work in our climate. Already she has lost a part of her variety. Nothing can be more green than the vines, the orchards, and the forests ; but the shades are not so pleasing. The meadows begin to whiten, and their flowers are mowed down. The corn grows insensibly yellow, and the number of the flowers diminishes. Lately the variety and vivacity of these, with the various notes of a multitude of birds, had all the charms of novelty, and cheered us in the most delightful manner. But, the nearer we come to autumn, these pleasures diminish : the nightingale is silent, and walking becomes inconvenient because of the excessive heat.

May we not see in this an emblem of our life ? Are not the pleasures we enjoy equally transient ? Even the most innocent, those which nature affords us, during the spring, change and give place to other objects. That which we now observe in the summer of nature, we may also see in the summer of life. When we have attained our fortieth year, which is the beginning of a ripe age, the world, in

Beginning of summer.

respect to us, will lose part of those charms which delighted us in our youth. And when we approach the autumn of life, we often become a prey to many cares and anxieties; and are less sprightly, less calm, and less happy, than we formerly were. We shall then observe, that our bodily strength diminishes insensibly by age; and, finally, the days will come in which we shall say, *I have no pleasure in them.*

But, with what heartfelt joy may we lift up our souls to thee, O Lord, who directest the seasons, who art the father of all beings, and the fountain of felicity! In this also we may acknowledge thy wisdom and goodness, who causest the seasons to succeed each other in so regular an order. Let us never forget thee, while enjoying those pleasures which summer diffuses over nature: thee, who orderest all things, and whose glory each season proclaims! And may we do this the more now, because it may be the last summer which we shall ever see upon earth. Alas! how many of our friends and acquaintance, who, in the last summer, enjoyed with us the beauty of the earthly world, have been removed by death before this summer began to exist? Possibly we may be soon called to rejoin them. Probably this is the last time we shall ever see the beauties of nature! O may we live this summer as if it were to be our last! May we glorify our God with as much ardour as we should, were we assured that we should have it no more in our power to perform this duty here below! Let us live in such a manner as never to regret that we have seen so many returns of the seasons! Condescend, O Lord, to confirm us in these resolutions by thy Spirit: and, as thou hast inspired them, give us power to reduce them to practice!

JUNE XXII.

THE NIGHTINGALE.

THE nightingale is a musician of the first order among the inhabitants of the groves. When all the birds who during the day cheered us with their melody, cease to be heard; then the nightingale tunes her voice to animate the woods and groves. When we listen to the thrilling sounds of her voice, we are apt to conclude that the bird must be large, that her throat must have uncommon strength; and the inimitable charms of her melodious accents make us presume that in beauty she surpasses all other birds.

But in vain do we seek these perfections in the nightingale: she is a bird of a mean appearance, the colour, form, and the whole exterior of which have nothing attractive or majestic;—little that appears to advantage. Nature, however, to compensate for her plainness, has given her a voice the charms of which are irresistible. Listen to her long quavering notes: what richness, variety, sweetness, and elegance! When she begins to sing, she seems to study, before hand, the melodious accents which she is going to pour forth. She begins

The nightingale.

softly, then the notes swell gradually, and succeed each other with the rapidity of a torrent. She proceeds from grave to sprightly notes ; from simple sounds to the wildest warblings ; from the lightest turns and quavers, to languishing sighs ; and in each, possesses the art of pleasing the ear.

This bird may give rise to a number of useful and edifying thoughts. For instance, we may learn from her this truth, that homeliness of body is sometimes united with amiable qualities, and does not preclude mental beauty. How unjustly do those act, who, attaching themselves only to the features of the face, and qualities merely external, neither praise nor blame any thing but what strikes their senses ; and who despise, or treat with asperity, those of their fellow-creatures who have bodily defects : let us learn to judge with more equity. Yes, a man deprived of the advantages of figure and fortune, may manifest in his conduct a wise and holy mind, and thus render himself worthy of our esteem. The perfections of the soul alone, give a man true merit, and render him worthy of admiration : other things can only seduce those who are incapable of estimating wisdom and virtue. Have we not seen persons, who were neither distinguished by birth nor fortune, render the most important services both to the church and state ? Often ill proportioned or deformed persons have shown more magnanimity of soul, than those who were favoured with the most beautiful and majestic form. "This is a lesson, not to trust to appearances. Often those whom we dare to despise, are found to be superior to ourselves."

When we hear the skilful harmony of the nightingale ; should it not naturally lead us to that God who is the author of this talent ? What wisdom must there be in the formation of this bird, which makes it capable of such sounds ! Lungs so delicate as those of the nightingale, the motions of which are so violent, must be easily hurt, had they not the singular advantage of being attached to the vertebræ of its back, by a multitude of strong fibres. The opening of the windpipe is very wide, and this doubtless contributes much to the variety of its notes ; which, while they charm the ear, may fill the soul with a sweet and pious delight. May we not here discover evidences of a wise and gracious Providence ; and be excited, by the songs of the nightingale, to glorify the Author of nature ?

Amiable songstress ! I will not leave thee till I have learned of thee to celebrate thy Creator and mine. Pour, by thy songs, gratitude into the hearts of the many insensible mortals, who in these cheerful days contemplate, with indifference, the beauties of the creation !

Pleasures which summer affords to our senses.

JUNE XXIII.

THE PLEASURES WHICH SUMMER AFFORDS TO OUR SENSES.

SUMMER has inexpressible charms ; and gives us daily proofs of the infinite beneficence of the Creator. It is the happy season in which God pours out the treasures of his bounty in the most abundant manner on every living creature. After nature has reanimated us by the pleasures which the spring affords, she labours incessantly throughout the summer to afford us what may gratify our senses, render our subsistence easy, satisfy our wants, and awaken our hearts to sentiments of gratitude and love.

In virtue of the secret laws of nature, an innumerable quantity of fruits grow before our eyes in the fields and gardens ; fruits which, having pleased the sight, may be afterward gathered and preserved for our food. Flowers present to our senses the most pleasing variety. We admire their superb dress, and the riches, and inexhaustible fecundity of nature, in the multiplicity of their species. What beauty and variety do we find in plants, from the humble *moss* to the stately *oak* ! Let us go from flower to flower, there are still new charms.—Let us climb the highest mountain ; let us seek the cool shade of the woods ; let us descend into the vallies ; new charms appear every where ! A multitude of objects present themselves to our eyes, all different from each other ; and yet each possessing some beauty sufficient to engage our attention. There, innumerable flowers, and here, divers kinds of living creatures. If we look upwards, our eyes are delighted with the celestial azure ; if we look downwards, they are refreshed with the beautiful verdure with which the earth is clothed. Our *ear* is delighted with the joyous notes of the aerial songsters ; their varied and simple melody fills the soul with the most agreeable and pleasing sensations. The murmuring of the brooks, and the silver curls of a fine flowing river, please both the eye and ear.

To please our *taste*, strawberries, and other delicious fruit, ripen, which, independently of the pleasure they afford, communicate a salutary coolness to the blood. Our barns and storehouses are filled with the new productions of our fields and gardens ; which not only please our taste, but afford us the most wholesome nourishment. The *smell* is struck with sweet emanations from every quarter. In a word, a thousand pleasing objects appear to exercise our senses, and excite our sensibility. Numberless flocks feed on the abundance of generous nature ; and digest wholesome herbs, to procure us the health-giving milk, and nourishing fleshmeat. Copious showers moisten the earth, and open to us new sources of blessings. Tufted trees, and smiling thickets, cover us with the most delightful shade. All that we see, hear, taste, or smell, increases our pleasures, and contributes to our felicity.

Pleasures which summer affords to our senses.

But the creation is a scene still more extensive and exchanting for the mind than for the senses. Where the senses cannot reach, the mind discovers beauty, harmony, variety, and new pleasures. In all the objects of creation, it perceives the Creator of all things, the source and life of beauty, and the author of all good. Yes, O adorable Being, I see thee in every creature. If I lift my eyes to the heavens, the sun, the moon, and every star, tell me that thou hast made them. If I smell the balsamic odour of flowers, that sensation teaches me, that it is thou who hast formed me so as to exhale those sweet perfumes. If I taste a delicious fruit, I am convinced, that to manifest thy goodness towards me, thou givest me so many means of nourishment. All that I perceive through the medium of my senses, leads me to thee; and this exalts and ennobles all my sensations. While I am employed with those sensible beauties, I rise imperceptibly towards the most sublime object; towards the centre of perfection. While my attention seems only to be fixed on earthly things, my thoughts soar up insensibly to heaven, and are lost in the abyss of eternity.

O heavenly joy! is there any pleasure upon earth for which I would exchange thee? Is there any thing in it that equals thee in worth? O how I wish to give myself up to these contemplations, that the gratification of my senses may furnish my mind with the most exquisite nourishment! But can it ever be satisfied? No! Though I should see a thousand new summers upon earth, I should always discover new objects of admiration. And this, to me, is a strong proof of that life to come for which I hope. There, my senses shall be more exquisite; and my understanding more perfect than here below. What beauties shall then present themselves to my view! How ecstatic shall my joy be! What thanks do I owe unto thee, O Lord Jesus, for such sublime hopes as these!

JUNE XXIV.

A SKETCH OF THE INWARD PARTS OF THE HUMAN BODY.

THE more difficult it is to gain a proper knowledge of the internal parts of the human body, the more necessary it is to profit by the instructions which eminent anatomists have given us. With this design I am going to give the reader a short description of those parts.

The *heart*, placed in the *thorax* or *breast*, is the spring of motion to the whole machine; and highly deserves our admiration. The viscus consists of muscular fibres, curiously interwoven. Two cavities, called *ventricles*, separated from each other by a partition, are formed within this organ. As the heart continually dilates in order to receive the returning blood, and contracts in order to diffuse it through the whole system.

The *lungs* are a spongy body, which, like *bellows*, open and shut to take in and expel the air. They extend on both sides, and nearly

 Sketch of the inward parts of the human body.

fill up the whole capacity of the breast, to cool it with the air which they *inspire*, and to prevent the blood from being too much attenuated. The breast is covered on the inside with a fine thin membrane, called the *pleura*. Under the lungs, the *stomach* is placed, which receives and digests the food, and is shaped like a purse. On the right side is the *liver*, which covers one side of the stomach, and by its heat assists digestion. It separates the *bile* from the blood, which is collected in a particular vessel called the *gall-bladder*: this liquid descends into the intestines; and the irritation which it there occasions, helps to expel the excrements.

Opposite to the liver is the *spleen*, which is a soft bag, and easily stretched. The blood is brought into it by the arteries, and proceeds from it by the veins. Behind the liver and spleen, are the *reins* or *kidneys*. Of these there are two; one on the right, and the other on the left: their use is to separate from the mass of blood, the humours which empty themselves in the bladder. Under these parts are situated the *intestines*, which are attached to the mesentery; they complete the separation of the digested food; and what is unfit for nutriment they expel from the body. The *mesentery* is a great membrane, with a variety of foldings, to which the intestines are attached. In the mesentery are seen innumerable vessels as fine as hairs, which are termed the *lacteals*, because they contain a juice extracted from the food, similar to *milk*. In the middle of the mesentery is a large gland, where the *lacteal* veins unite as in a common centre. A skin full of folds, glands, and muscles, covers all the intestines. All that part of the body called the abdomen, which begins at the stomach, is separated from the breast by the *diaphragm*, or *midriff*. It has several openings, to give passage to the vessels which are to descend to the inferior parts. The liver and spleen are fastened to it. Laughter is occasioned by an agitation of this membrane; and this, it is supposed, helps to disengage the spleen from the humours which incommode it.

Such are the principal parts of the *thorax* and *abdomen*; but, besides these, there are several others which communicate with them. At the beginning of the neck are the *œsophagus* (gullet) and *windpipe*. The *œsophagus* is the canal through which the food passes into the stomach: by the windpipe the air penetrates into the lungs. When the lungs send back the air through this channel, the voice is formed; and at the same time, the breast throws off its superfluous humours. At the top of the windpipe, is a small *valve*, or covering, which opens to give passage to whatever is to come out by this tube. The lower orifice of the stomach is provided with a similar valve, which opens when it is pressed by the food; and shuts again to prevent it from returning. In the upper part of the head, the *brain* is placed; which is capable of receiving impressions from external objects. Its whole mass is covered with two fine, transparent membranes; the outer of which is called the *dura mater*, the inner, the *pia mater*.

 Sketch of the inward parts of the human body.

The former has a multitude of arteries and veins, interspersed over it : the latter closely invests the substance of the brain.

Besides these parts, each of which occupies a determinate place ; there are others which are dispersed over the whole body, such as the bones, arteries, veins, lymphatics, and nerves. The *bones*, united together by joints, serve partly to support the body, and render it capable of motion ; and partly to preserve and protect its nobler parts. The *arteries* and *veins* are diffused through the whole body, to nourish it by the blood which circulates in them. There are also many *lymphatic vessels*, which ordinarily join to certain glands, and receive a yellowish and transparent liquor, which they distribute afterward to the whole body.

The *nerves*, of which ten principal pairs are reckoned, are like little cords : they proceed from the brain, and distribute themselves over the whole body : they include a kind of medullary substance like that of the brain, and are the organs of sense and motion to the whole machine. All these parts are pierced with holes, to the end that the light and subtile matter which superabounds, may transpire. These holes, which by their extreme fineness are invisible to the naked eye, are called *pores*. The same wisdom, so visible in the solid parts of our bodies, is found equally so in the fluid. The *blood*, *chyle*, *lymph*, *bile*, *marrow*, *nervous juice*, and the different kinds of viscous and glutinous humour, which innumerable glands furnish their several properties, ends, effects, the manner in which they are prepared, filtrated, and separated from each other ; their circulation, and reparation, all announce the most astonishing art, and the most profound wisdom.

Let us now recapitulate what we have said on the internal structure of the human body. The *bones*, by their joints and solidity, form the ground-work, or frame of this beautiful edifice. The *ligaments* are the cords, which fasten all together. The *muscles* are fleshy substances, which execute their functions as elastic springs. The *nerves*, which extend to all parts of the body, establish between them the most intimate connexion. The *arteries* and *veins*, like rivers, convey health and life to every part.

The *heart*, placed in the centre, is the focus where the blood collects, and the *primum mobile*, from, and by means of which, it is circulated and preserved. The *lungs*, by another power, take in the external air, and expel noxious vapours. The *stomach* and *intestines*, are the magazines and laboratories, where those matters are prepared which are necessary for daily supply. The *brain*, the seat of the soul, is formed in such a manner as is suitable to the dignity of its inhabitant. The *senses*, the servants of the soul, give it information of all that is necessary for it to know ; and minister to all its pleasures and wants.

Adorable Creator ! With what marvellous art hast thou formed us ! Though the heavens, which proclaim thy glory, did not exist ; though there were no other created being upon earth but myself, my body alone would suffice to convince me of thy existence, the immen-

sity of thy power, and the infinitude of thy goodness. It would be highly criminal in me not to pay attention to this subject. May that sinful indifference which is an insult to my Divine Author, be far from me ! As often as we meditate on the structure of our bodies, we should praise Him who has formed us with so much wisdom. And can we do less, in return for so great a proof of God's goodness ?

JUNE XXV.

THE ELECTRIC FLUID.

FROM the many experiments made in our time, no person now doubts the existence of the *electric fluid* ; the singular effects of which have engaged the attention of Europe for more than half a century. It appears, that this fluid is equally distributed through all bodies : but, like the air, it is not apparent to our senses till it is agitated. The equilibrium, which has been interrupted by any cause whatever, must be restored, before we can sensibly perceive the *electric fluid*. Here we must distinguish two kinds of electric bodies : the first are such by nature ; the electric fire, be it what it may, can be excited and increased in them by means of friction. The second receive that electric power not by friction, but by communication with the former. The principal bodies which compose the first class, are glass, pitch, rosin, sealing-wax, hair, silk, and air. All other bodies, but especially water, and metallic substances, appertain to the second. Bodies of the first kind may be rendered capable of preserving the electric matter which is collected in them : those of the second class, on the contrary, lose it as soon as they receive it.

Machines have been invented, in which, by means of a wheel, a rapid motion is given to a glass globe or cylinder, which in turning round, rubs against the hand or a cushion. Through this friction the globe preserves its electric virtue, which may be extended at pleasure by wires or chains, which communicate with the glass globe. If, while the machine is working, the hand touch one of these wires, a smart shock is felt ; and if the place be darkened, a luminous spark will be perceived. Let any number of persons take hands, and form a circle ; and they will all receive the electric shock in the same moment, which may be made more or less violent. We can give the electric fire power sufficient to kill, not only sparrows, and other little birds, but also hens, geese, cocks, and even sheep.

This experiment succeeds only where there are several glass jars or bottles, nearly filled with water, and united with chains to each other, and in communication with the glass globe, working as before described. The water communicates to the internal surface of the bottles a large quantity of the electric matter ; the outward surface at the same time losing an equal quantity by means of its communi-

Electric fluid.

cation with some conducting body. A violent flash, a loud explosion, and violent agitation, ignition of combustible matter, and the death of the animal, are the consequences of this experiment.

There are other effects which are common to all kinds of experiments ; such as a sulphureous smell, an agitation of the air, and the electric matter acquiring a new property. It has been observed, that some experiments have failed, because the wires which served as conductors of the electric matter, were too angular and pointed. It was then supposed, the electric matter became dissipated by the points. This conjecture was confirmed on putting the face or hand near the angles and points, a copious stream of the electric fluid was perceived to issue from them. It was then conjectured, that these points which cast off the electric matter, might also attract it ; and a number of experiments have confirmed the truth of this conclusion.

Should any one ask, What is the use of all these observations ? We answer ; a two-fold use has already been found out ; and we may learn further uses of this singular phenomenon of nature in time to come. The physicians have applied electricity to their art ; and there are many examples of paralytic limbs being cured by electric shocks. Other naturalists have found out a great analogy between the electric fluid and *lightning* ; and this has given rise to new ideas concerning the formation of thunder ; and has completely changed the former opinions on that subject.

Thus, we receive from time to time new solutions of the mysteries contained in the great works of the Creator. How limited are the views of man ! How little attention does he pay to those important things which are placed before his eyes ; seeing the phenomena of which we speak have lain hid for so many ages ! Even at present, how little do we know of nature, and how much have we yet to learn !

JUNE XXVI.

THE MANNER IN WHICH THUNDER IS FORMED.

FORMERLY, and even to the beginning of the eighteenth century, it was commonly supposed that thunder proceeded from an inflammation of salts, sulphureous matters, and other substances, which are found in the air. It was imagined, that there was the greatest resemblance between the effect of fire-arms and that of thunder and lightning. But all the explanations by which men endeavoured to establish this system, were not sufficient to remove the difficulties which opposed it ; or to account for the fact. But since proper attention has been paid to the phenomena produced by the electric fluid, we have been authorized to attribute the same cause to each. The perfect resemblance between it and electricity, has convinced naturalists,

The manner in which thunder is formed.

that they are identically the same : and that electricity is the same in our hands that thunder is in the hands of nature : thunder executes at large what we imitate in miniature. It will not be difficult to demonstrate this, even to those who are unacquainted with natural philosophy, if they will only take the trouble to compare the effects produced by thunder with those produced by the electric fire.

The effects of thunder are discovered by peals, heard at a distance, and by conflagration. Buildings which are struck by it, often become a prey to the flames. Men struck by it become livid, and appear scorched, though sometimes there is no trace of the fire ; the violence of the stroke alone having killed them : their clothes are all torn to rags, the lightning throws them to some distance from the place in which they were struck ; and often that part of the body where the lightning fell is pierced with holes. Sometimes great stones are broken by it ; and its ravages are easily discoverable on the ground where it falls.

The electric fluid produces the same effects, but in a less degree. When its power is increased by means of water, the electric flash is followed by a very sensible commotion : the most compact bodies are perforated, birds and small animals are killed, and each flash is accompanied with noise. The stream of fire which proceeds from the points of electrified bodies with a hissing noise, is one of the phenomena found in lightning. In regard to velocity, there is still a greater resemblance between lightning and the electric fluid. If, during a thunder storm, a sword or chain be hung in the air, by means of silken strings, it becomes electrified ; if the finger be put near it, bright sparks of lightning proceed from it, the strength of which is proportioned to the storm and distance from the electric cloud. In a word, every effect of electricity appears during a thunder storm. After so many experiments, we cannot doubt but the air is highly electrified during a thunder storm ; and that the thunder and lightning are the mere effects of a violent electric fire.

Thus, what appears wonderful and fatal in these natural phenomena, disappears in proportion as we get acquainted with the laws of nature. Consequently, every one should have a general knowledge, at least, of the first principles of natural history. Fear and superstition, which so often mingle themselves with our observations of nature, would be quickly annihilated, if we reflected more particularly on it, or ourselves ; or consulted those who were properly acquainted with the subject. Let us use the light we have to banish that fear and distress which seize on our minds at the approach of a thunder storm ; and henceforth, let us look up, without terror, to that God who performs such great marvels : for how capable soever we may be of assigning the causes of thunder, according to just and invariable principles drawn from natural philosophy, the phenomena continue to be no less marvellous ; and they present certain circumstances which will ever be inexplicable even to the most enlightened genius. It is enough for us to know that the nature of the air,

The manner in which thunder is formed.

and the whole surrounding atmosphere, render this phenomenon necessary : that these storms are means, in the hands of God, to fertilize the earth ; and that, therefore, they should excite us to render our tribute of praise and thanksgiving to our great Creator.

JUNE XXVII.

HERRINGS.

IN this season, the herring fishery commences on the coasts of England and Scotland ; by which we shall receive, in a short time, a great quantity of these fish, which, during the course of the year, shall furnish nourishment for the poor as well as the rich. Let us examine what is most important in the natural history of these fish.

An innumerable multitude live in the Frozen Sea, near the Arctic Pole : but, at a certain period, they quit their abode, and come in great shoals to the English and Dutch coasts. We cannot exactly tell what is the cause of this emigration : some suppose it is to escape from the whale, and other large fish, inhabitants of the Frozen Sea : others imagine, that the prodigious multiplication of the herrings obliges them to take long journies : because, being too numerous under the northern ice, they are obliged to detach colonies to other places, that they may find means of subsistence. Probably, it is the desire of propagating, and a particular instinct, which leads them to places more favourable for the multiplication and support of their species.

All these reasons may operate to induce vast shoals of herrings to leave the North at the beginning of the year : for by the month of March, the western wing of this immense army reaches the coasts of Ireland. Herrings are so numerous about this island at this time, that they take up great numbers of them at once with the scoop with which they water the sails. The eastern wing advances further into the Baltic Sea. A part of it turns towards the North Cape, comes down the coast of Norway, and enters by the Sound into the sea. Another part steers for the northern point of Jutland ; and afterward enters into the Zuyder Sea ; whence it proceeds into the Baltic, in order to return to its primitive residence. But the most numerous detachment of the eastern wing, is that which turns straight to the western coasts, and arrives at the Orkneys, where the Dutch go to catch them. There, about the 8th of June, the sea is full of herrings : afterward they turn towards Scotland and England, where they fill all the bays and harbours with their *fry*. After having left England, they probably return northward to their own country : at least they then disappear, and we know not what becomes of them.

We have cause to be surprised, when we consider the prodigious number of these fish. A single female herring deposits at least 10,000 eggs, in the sea near to Great Britain. This great fecundity

Herrings.

renders credible what is said of the Dutch fishery, they alone take annually about 200,000,000 of herrings: a fishery which not only supports a vast number of persons, but adds a sum of more than 2,000,000 of dollars to the Dutch revenue.

It is very just that we should lift up our hearts to the almighty and infinitely bountiful Creator; who, by a guidance full of wisdom, causes these fish to fall into the nets and hands of men. How many means does he use to provide for and support our lives! Every sea, lake, and river, is tributary to mankind, and contributes to their support.

“How populous is the mighty sea! How many armies swim in his bosom! There, the king of its inhabitants sports. There, amidst a thousand dangers, vessels pursue their course. Guided and preserved by thy providence, O Lord, all that live on the earth, in the ocean, and in the air, look unto thee, and thou satisfiest them with thy goodness.” And we also, O bountiful Father! are fed by the armies with which thou hast peopled the ocean. For our sakes the herrings take long voyages; and by them thou furnishest high and low, rich and poor, with a cheap and wholesome nutriment. May we receive this gift from thy hand with gratitude; and in the use of it, bless that God who has formed such profitable creatures!

JUNE XXVIII.

ECLIPSES OF THE SUN AND MOON.

IT is shameful, that in an age so enlightened as ours, not only the multitude, but those who pretend to be very far superior to the common people, should be still so ignorant in respect to these phenomena. Hence proceed those superstitious notions relative to eclipses of the sun and moon. If people would be at the trouble to examine the cause of them, they would at once see how ridiculous it is to shut up wells, for fear the water should acquire any noxious quality: and to use other superstitious precautions, which are a melancholy proof of ignorance and irreligion among men. Let us, therefore, endeavour to acquaint ourselves with this phenomenon, and the more so, because it is so remarkable in itself, and because it will furnish us with a new occasion to glorify our great Creator.

An eclipse of the sun is an effect purely natural; it is caused by the shadow which the moon projects upon the earth. But this cannot take place except when the moon, which is an opaque body, and naturally dark, comes nearly in a direct line between the sun and our earth. It then conceals a part, or the whole of the sun. The first is termed a partial, the second a total eclipse. Thus the solar eclipse is nothing else than the situation of the earth, when the moon's shadow falls upon it: and on this very account, this phenomenon should be termed *an eclipse of the earth*.

 Eclipses of the sun and moon.

We must not believe, that in this case the sun is really darkened ; it is only concealed for the time from us. This luminary still preserves his splendour ; and all the change that takes place is, that the rays proceeding from it, are prevented from reaching us by the body of the moon, which is then between the sun and our earth. Hence it is that a solar eclipse is never visible at the same time in all places of the earth. For unless the sun had really lost his light, the eclipse could not be seen in all places of the hemisphere at the same time : on the contrary, it is larger in some countries than in others ; and there are places where it is not visible at all.

The moon not only darkens the earth sometimes, but the earth also casts its shadow upon the moon ; and thereby totally or partially intercepts the rays of the sun ; this phenomenon is called an *eclipse of the moon* : but this can only happen when the moon is at one side of the earth, and the sun at the opposite side ; and consequently when it is a *full moon*. Now as this planet is really obscured by the shadow of the earth ; the eclipse is perceived at the same time from every part of one hemisphere of our globe.

Should the reader ask, of what use are the lunar and solar eclipses ? To those who do not estimate the utility of natural things merely by the sensible benefit which accrue from them, eclipses are of great importance. It is by their means we can determine the true situation of cities and countries, and trace, with the greatest exactness, maps of the most remote countries. Eclipses, well observed, tend to confirm chronology ; and direct the navigator, by shewing him his longitudinal distances east or west. These advantages, however unimportant they may appear to some, are of great utility ; and without them, the world would be deprived of a part of its happiness.

As often as we see an eclipse of the sun or moon, let us think of the great events which shall take place on the *last day*. What terror shall then seize the hearts of men, when they shall see the sun darkened, and the moon lose her light ! when the elements shall melt with fervent heat, and the heavens pass away with a great noise, *2 Pet. iii. 10.* O may we then be found fit to dwell in that glorious place, where the sun and the moon shall be no longer necessary !

 JUNE XXIX.

THE STALK OF WHEAT.

WE see the wheat springing up day by day ; and the tender ear ripening insensibly, in order to furnish us in a few weeks with nourishing bread, that precious blessing granted by Providence to the labours of men. Let us cast our eyes over a field of wheat or barley, and endeavour to count the millions of ears which cover one single field ; and reflect on the wisdom of those laws which afford us such an abundance ! How many preparations were necessary to

The stalk of wheat.

furnish us with this most indispensable of all nourishment ! How many progressive changes must take place in nature, before the ear can lift up its head ! Behold it now almost ready to nourish us with its fruit ; and it invites us to meditate on its structure.

When the grain of wheat has been some time in the ground, it shoots up a stalk, which rises perpendicularly ; but it only grows gradually, that the grain may have time to ripen. It is for very wise reasons that it grows from four to five feet high ; to preserve it from the humidity of the ground, which would otherwise rot it. The height of the stalk contributes also to refine its nutritious juices, which it derives from the root ; and its round form favours this operation ; for, by this means, the heat penetrates every part of the stem. But, how is it possible that so delicate a stem can support itself : and carry so many ears without sinking under the weight, or being beat down by the least blast of wind ?

The Creator, in forming the stalk, took care to prevent all these inconveniencies. He has furnished it with four very strong knots, which serve as screws to keep it firm, without preventing its pliability. The structure of the knots manifests much wisdom. Like a very fine sieve, they are full of small holes, by means of which the sap arises, and the heat of the sun penetrates. These pores attenuate the juices, which are collected in them ; and thus purify them by causing them to pass through these fine strainers. The stalk is liable to be beaten down by tempests and heavy showers ; but its slenderness is its security : it is flexible enough to bend without breaking. Were it more hard and stiff, it might indeed resist all such attacks, but how then could it afterward serve for beds to the poor ?

By the side of the principal tube others spring up, not so tall, whose leaves, collecting the drops of rain and dew, furnish the plant with those nutritious juices, which are necessary for it. Meanwhile the ear, the essential part of the plant, is formed by little and little. To preserve these tender sprouts from dangers and accidents which might destroy them the moment of their birth, the two upper leaves of the stalk unite closely, not only to preserve the ears, but also to furnish them with the necessary nutritious juices. But as soon as the stem is sufficiently formed to supply the grain with juices of itself, the leaves dry by degrees, that nothing may be taken away from the grain, and that the root may have nothing to nourish which is useless. When this scaffolding is removed, the building shows itself in its own beauty ; the bearded corn waves gracefully ; and its beard not only serves as an ornament, but also as a defence against the insults of birds. Refreshed with gentle rains, it flourishes till the appointed time ; gives the husbandman the most pleasing hopes ; ripens day by day ; till at last, bowing under the weight of its riches, its head falls under the sickle.

What wonders of wisdom and power do we discover in the structure of a stalk of corn ! Yet we seldom pay attention to it, because it is daily before our eyes. But what other proof of his goodness can

The stalk of wheat.

the Creator give us, if we be unaffected with this? Ungrateful and insensible man! Open thy heart to the sweet sensations of joy and gratitude! As long as thou art capable of viewing a field of wheat with indifference, so long shalt thou be unworthy of the bread it so abundantly furnishes. Come and learn to think as a man; taste that noblest pleasure which a mortal is capable of upon earth, that of discovering thy Creator in every thing he has formed. Then only shalt thou rise above the brute, and approach the felicity of the glorified children of God.

JUNE XXX.

THE BLIGHT.

THIS is the name commonly given to those insects which are so numerous on the tops, stems, and leaves of plants, as sometimes to cover them entirely. There are nearly as many different species of these animals as there are of plants; and they deserve our attention more than any other insect, because of the singularities which we discover in them. What distinguishes them from all known animals is, that they not only lay eggs, but bring forth young ones alive. As long as the fine weather lasts, they are viviparous, i. e. the young proceed from their mothers full of life, and perfectly formed; doubtless because the plants at that time afford them sufficient nourishment. About the middle of autumn, they lay eggs; which, however, are not hatched, till the following spring; because, if the young ones were produced sooner, they must die for lack of nourishment.

At the very time when the female begins to lay, the male appears, which seems to intimate that his existence was not necessary before. This conjecture has been fully confirmed by experiments which have been made on these animals. If a young one be taken at the moment of its birth, and be put by itself in a glass, the animal thus sequestered, will produce one just like itself, when it has acquired a certain degree of growth; and at the end of a few weeks, it will be encompassed with a numerous family. If the experiment be repeated on one of its young, and even on many generations, the result will be the same; which proves, that these animals engender of themselves without copulation.

Let us also notice another singularity. In some sorts of insects the males have wings, and the females have none: but in these, both sexes are alike: both are produced with, or both without wings. Those which have wings are so small when compared with those that have none, that the latter walk over them as we see a gnat walk over fruit. This remarkable instance of what may be called singularities in nature, an example which differs so widely from common rules, and in which, notwithstanding we may discover very wise designs, leads us naturally to ask, Why are there such singularities in nature?

The blight.

And what could induce the Creator to depart sometimes from fixed laws ? In order to answer this question in a satisfactory manner we should be capable of comprehending the great whole of created things, to know at once all the parts of the immense kingdom of nature, and the connexion that is between them ; to be able to judge in what, and how far each thing may be useful or injurious to the *whole*.

But as such a profound knowledge is denied to our weak nature ; let us content ourselves with some general reasons, which may, in some measure, serve to solve the proposed question. 1. God shows us, by these singularities, the command which he has over all nature. He is the Supreme Legislator, who assigns to each being the laws which it must inviolably observe. He, to whom all beings must submit, has a right to prescribe such and such rules to them : but he has power also to suspend his rules, and to make what exceptions to them he pleases. 2. We find a great variety throughout all nature, which furnishes us with reasons, both to admire the glory of the Creator, and to rejoice in the contemplation of his works. It is easy to perceive how much these exceptions to general rules increase this variety ; and consequently, the *pleasure* of the observer, as well as his *admiration* for the Author of nature. 3 Experience teaches us, that the objects which we have constantly before our eyes become familiar to us ; and their reiterated impressions leave us cold and indifferent. The magnificent scene of nature does not always interest us : because we have acquired the habit of lightly passing by those things which we commonly see. Thus, each singularity, each extraordinary phenomenon, is a new invitation to contemplate the works of God ; and tends to awaken us from our indolence. 4. The singularities of the natural world, far from injuring the perfection of the whole, enter into the plan of Divine Wisdom ; and teach us, that the singularities of the moral world, and the different states of men, are equally under the direction of the All-wise Being, who well knows how to govern and direct all things, so as to display the glory of his holy name.

JUNE XXX.*

A HYMN ON THE WISDOM OF GOD.

SOLE object of my praises, I will glorify thee for ever. O my God ! Who is like unto thee, O thou Most High ! For, from thee proceed wisdom, counsel, and understanding. Grant, that my soul may be always attentive to the wisdom which shines in thy works : that I may join with angels in celebrating thy glories !

Wheresoever I look, I discover nothing but beauty and harmony. What grandeur ! What magnificence ! Jehovah has created, he preserves, and he blesses ! His hand has fashioned this superb universe, that he might fill it with happiness !

A hymn on the wisdom of God.

Thou hast hung up in this immense arch, the stars of the night, and the flambeau of the day, the inexhaustable source of light and heat. Thy hand alone guides and supports them through the immensity of space.

Who is it that balances these enormous masses? Who has taught our globe to swim in a flood of light? What hand has directed the rays with so much wisdom, that they are useful without injuring us; and that they warm and animate without consuming us?

Who has ordered the air, the principle of life and motion, to encompass our globe? The vapours are collected: they change into dew, rain, fertility, and blessings for men and animals. Who has formed the air, that it engenders lightnings, sends forth the winds, becomes the vehicle of sounds to the organs of hearing; lifts up the light bird; causes the fish to swim; and renders our voices capable of celebrating thee, O thou Most High?

Who has separated the dry land from the ocean which covered it; and to render it fruitful has divided the waters? Who collects and restrains them within the prescribed bounds? Who says to the waves, Hitherto shalt thou come, and no further?

Who supports the earth; who plants the forests, and clothes the fields with herbage? Who causes the corn and the vine to grow? Who raises up the mountains? Who digs these gulfs whence torrents of fire issue? Who has placed minerals and metals in the depths of the earth?

Lord! it is thy wisdom which enriches, adorns, supports, and blesses the world, peopled with so many different beings. My songs shall celebrate thee incessantly: I will bless thee as long as I live; let every thing that has breath adore the only wise God! Amen.



JULY.



JULY I.

A HYMN IN PRAISE OF THE AUTHOR OF NATURE.

HOW great art thou, O Lord my God! The earth proclaims thy majesty, and the heavens are the throne of thy glory. Thou hast said, *Let them be!* and at thy command, they were extended in the immensity of space.

The thunder causes thy praise to resound; and in formidable array thou walkest on the wings of the lightning! I perceive thee in the splendour of the sun; and see thee in the flowers which deck our fields.

A hymn on the wisdom of God.

Is there a god like unto our God?—Who is it that walks on the winds? Who holds the thunder in his hands? Who commands the lightning to blaze through the forests?

It is thou, thou alone, O Lord! thousands of worlds glorify thee: thou hast given them their being; but, at thy threatening, they flee away—are annihilated, or assume a new form.

The whole creation is a temple erected to thy glory. In it thou hearest thy praises celebrated. Millions of celestial choirs adore thee with songs of thanksgiving.

All celebrate thy glory, from the seraphim, who behold thy face, to the most insignificant worm, which crawls on the earth. The creatures which now exist, and those which are in embryo, are all under thy government, all submit to thy authority.

What is man, that child of dust, that thou shouldst set thy heart upon him! O God, in whom I put my trust, I adore and bless thee, for all the mercies I have received from thy hand.

Thou hast placed me in a distinguished rank: the inhabitants of the sea, of the air, of the fields, and forests, are put under me; all the creatures here below acknowledge me for their sovereign.

O Jehovah! how magnificent is thy name! thy praise resounds to the limits of the universe; thy works proclaim thy glory from eternity to eternity!

THE SAME IN VERSE.

My God, how glorious is thy name!
The earth, the heav'ns declare thy fame,—
Thy footstool, and thy throne.
“Ye heav'ns exist!” thy mandate said:—
Through ample space the heav'ns were spread;
Thou spak'st, and it was done.

The thunder's voice, the lightning's wing,
The splendid sun,—my God, my KING,
The fair unfolding flow'r,—
Suns, lightnings, flowers, are full of thee;
In earth, in heaven, in all, I see
Thy majesty and pow'r.

Upon the whirlwind's wing, who rides?
The burning bolt of heav'n, who guides?
What God can equal ours!
Whose phials, when the forest gleams,
Diffusing wide th' electric streams,
The lightning torrent pours.

Thine, thine, JEHOVAH, thine alone!—
Ten thousand worlds, around thy throne,

A hymn on the wisdom of God.

Depend upon thy word.
 Thou frownest ;—see, they all disperse ?
 Thou smilest ;—see, the universe,
 With all its worlds, restor'd !

Erected by almighty hands,
 A temple for thy glory, stands
 This universe sublime :
 All being pours thy praises forth ;—
 The creeping reptiles on the earth,—
 The burning seraphim.

Heav'n's millions hymn thy name on high,
 Inhabitants of yon fair sky,
 Who all thy glories see ;
 Not less obsequious to thy nod,
 The embryo worm obeys its God ;—
 All being bows to Thee !

Ah, what is man, frail child of dust !
 That thou in whom I dare to trust,—
 That thou, IMMORTAL KING !
 Should'st call him forth thy love to share ?
 Thy mercies how can I declare,
 Or how thy goodness sing ?

Exalted by thy sov'reign hand,
 Myself a sov'reign, lo, I stand,
 And see, beneath my feet,
 My subjects of the air, and sea,
 Of fields, and forests, bow to me,
 And to my sway submit.

O how magnificent thy name !
 JEHOVAH, infinite thy fame !
 Creation's ample round
 Shall echo thy supernal praise,
 And universal nature's lays
 Eternally resound.

T. R.

JULY I.*

FOREIGN PLANTS.

ALL our different kinds of corn, and a great number of our vegetables, derive their origin from strange countries, commonly warmer than ours. Most of them come from *Italy* ; *Italy* had them from *Greece* ; and *Greece* from the *East*. When *America* was discovered,

Foreign plants.

a multitude of plants and flowers, hitherto unknown, were then found, and transported into Europe, where they have been cultivated with much success. Even now the English are at a great deal of trouble to cultivate several North American productions in their own country.

The greater part of the different kinds of corn, which make the best nourishment both for man and beast, are grass plants ; but, though they at present cover our fields, they are nevertheless exotics. *Rye* and *wheat* are natives of *Little Tartary* and *Siberia*, where they still grow without cultivation. Whence *barley* and *oats* come, we know not ; but are sure they are not natives of our countries : were it otherwise, they would not require cultivation. *Rice* is a production of *Ethiopia*, whence it was first carried into the East, and afterwards into Italy. Since the commencement of the eighteenth century, it has been cultivated in America ; and at present they send vessels annually into Europe laden with this useful grain. The *French*, or *buck wheat*, comes originally from *Asia* ; the Crusaders brought it to *Italy* ; whence the Germans received it.

Most of our vegetables have a similar origin. *Borage* comes from *Syria* ; *cresses* from *Crete* ; the *cauliflower* from *Cyprus* ; and *asparagus* from *Asia*. We are indebted to *Italy* for the *chervil* ; to *Portugal* and *Spain* for the *dill* ; for *fennel* to the *Canaries* ; and for *anise* and *parsley* to *Egypt* ; *garlic* is a production of the *East* ; *cives* came from *Siberia*, and *radishes* from *China*. For the *kidneybean* we are indebted to the *East Indies* ; for the *gourd* to *Astracan* ; for *lentils* to *France*, and for *POTATOES* to *Brazil*. The Spaniards brought *tobacco* into Europe in 1530, from *Tobaca*, a province of *Yucatan*, in New Spain.

The ornaments of our gardens, the most beautiful flowers, are all foreign productions. *Jessamine* comes from the *East Indies* ; the *Spanish alder* from *Persia* ; the *tulip* from *Cappadocia* ; the *narcissus* from *Italy* ; the *lily* from *Syria* ; the *tuberose* from *Java* and *Ceylon* ; the *pink* from *Italy* ; the *aster* from *China*, &c.

Let us acknowledge, with gratitude, these various presents from heaven. With what goodness has the Lord provided for our pleasure and happiness ; in rendering even the most distant countries tributary to us ! But let us learn also to know the constitution of the globe on which we dwell. There is a universal transmigration upon the earth. Men, animals, and vegetables, are transplanted from one region to another. And this transmigration shall end only with our globe.

Into whatever part of the world it may please thee, O Lord, to transport me, may I endeavour to act uprightly, and bring forth fruit, not only for the good of my contemporaries, but also of posterity ; until I arrive in those regions of bliss and perfection, where nothing shall be subject to change !

JULY II.

THE METAMORPHOSIS OF THE CATERPILLARS.

THE transformation of a caterpillar into a butterfly is certainly one of the most curious phenomena of nature : and highly merits our attention. The manner in which caterpillars prepare themselves for their change is truly astonishing. They do not immediately become butterflies ; but they pass to it through a middle state. After having cast their skins three or four times, they strip off their last coat, and become a substance, which in no respect resembles a living creature. They then wrap themselves up in a hard shelly covering, called the *chrysalis* or *aurelia*, and which somewhat resembles a child in its swaddling clothes. In this state they continue two or three weeks, sometimes six or ten months, till at length they issue from this species of sepulchre, under the form of butterflies.

There are properly two kinds of butterflies, the wings of the one are raised, those of the others lie flat. The first fly during the day, the latter during the night. The caterpillars of the nocturnal butterflies, or *phalenæ*, spin themselves a cone, and shut themselves in it when the time of their transformation approaches. Those which are to be diurnal butterflies hang themselves in the open air to a tree, a plant, a lath, a wall, or some such thing. In order to this, they make themselves a very small web, with very fine thread ; and then turning themselves upside down, they suspend themselves so that their head inclines a little towards the top. Some caterpillars, and especially the hairy, or prickly ones, continue suspended in this state perpendicularly, with the head downward. Others spin themselves a thread which goes round the middle of their bodies, and is fastened at both sides. In one or other of these two ways, all the diurnal butterflies prepare themselves for the grand change which they are to undergo. Thus, the two species of caterpillars, the diurnal and the *phalenæ*, bury themselves alive, so to speak, and seem to wait patiently the end of their caterpillar state, as if they foresaw that, after a short repose, they should receive a new existence, and should manifest themselves under a splendid form.

The death and resurrection of the just cannot be better compared than to the metamorphosis of the caterpillar into a butterfly. To genuine Christians, death is only a species of sleep ; a sweet rest after the pains and miseries of this life ; a moment, during which they are deprived of life and motion, only that they may appear afterward with more glory, and enter into a new and better state of existence.

What is a caterpillar ? A blind, creeping, despicable worm, which, while it drags on its life, is exposed to an infinity of accidents and persecutions :—and has man a better state in this world ?

The caterpillar prepares itself with the greatest care for its change, and for that state of inaction and weakness, in which, for a short time.

The metamorphosis of the caterpillars.

it must remain. It is exactly the same with a true believer. Before death comes, he prepares for this great revolution ; and he waits, with tranquillity and joy, the happy moment in which he shall enter into a better state.

The sleep of the caterpillar does not last for ever, it is only the forerunner of a new perfection. After its change, it appears in a more pleasing and splendid form. First it creeps upon the ground ; afterward it springs up, and mounts into the air, by means of its wings. At first it was blind ; now it is provided with good eyes, and enjoys a thousand pleasing sensations which were unknown to it before. Lately it stupidly confined itself to a very gross nourishment. At present, it goes from flower to flower, lives on honey and dew, and varies its pleasures continually.

In all this we may observe a lively emblem of the death and resurrection of a righteous man. His weak and earthly body shows itself after the resurrection in a brilliant, glorious, and perfect state. As a mortal man he was attached to the earth, subject to various passions, and occupied with sensual and terrestrial objects. But, after the resurrection, his body is no longer confined to the earth, he soars above thousands of worlds ; and, with a steady and penetrating eye, he takes in all nature at one view. His soul rises infinitely higher still, he approaches the Deity, and is absorbed in the most sublime meditations. Before his death, he was comparatively blind in his search after truth ; now he sees and can contemplate its greatest lustre. His body being spiritual, glorious, and incorruptible, he no longer desires gross aliments to satisfy his hunger and thirst : different sensations constitute his felicity at present ; he lives on heavenly food, and his heart overflows with unmixed joy.

Reader, does not this teach thee an important lesson ? If this be the glorious change thou expectest, make a timely and effectual preparation for it. " If our present state be but transitory and imperfect, let us not make it our chief object, nor our end. Let not the few moments we have here appear to us with the consequence of eternity !"

JULY III.

THE SILKWORM.

THE *genus* of caterpillars, which is divided into general *classes*, one of which comprehends the diurnal, the other the nocturnal butterflies, is farther divided into different *families*, each of which has its distinct characteristics and properties. To one of these families, the appellation of *silkworm* is given. This caterpillar, like the other, is composed of several moveable rings ; and is well provided with feet and claws, to catch hold, and fix itself wherever it pleases. It has two rows of teeth, which do not act upwards and downwards as ours

The silkworm.

do, but from right to left, which it uses to saw, cut, and slope out the leaves. All along the back, we may see through its skin a vessel, which seems to contract and dilate at intervals; and which performs the functions of the heart. At each side, this animal has nine orifices, which answer to so many lungs, and assist the circulation of the chyle, or nutritive juice.

Under the mouth it has a sort of *reel*, with two holes, from which it emits two drops of gum, with which its bag is filled. These are like two distaffs, which continually furnish the matter of which it makes its thread. The gum which runs through the two orifices, takes that form and lengthens out into a double thread, which immediately loses the fluidity of the liquor of which it was formed, and acquires the consistence necessary to support or wrap up the worm when the proper time is come. It connects the two threads into one, gluing them together by means of its fore-paws. This double thread, notwithstanding it is very fine, is nevertheless strong, and of an astonishing length. Each is formed of a thread 500 German ells long. And as this thread is double through its whole length, each cone contains 1000 ells, the whole of which weighs only *two grains and a half*!

The life of this animal, while it is in its caterpillar state, is very short. Nevertheless, it passes through different states, which insensibly bring it to perfection. When it comes out of the egg it is extremely small and perfectly black; but its head is of a more shining black than the rest of its body. Some days after it begins to grow whitish, or of a dark grey: afterward its coat becomes dirty and ragged: then it throws it off, and appears in a new dress. It now becomes much larger and whiter, but a little tinged with green, because it feeds on green leaves. After a few days, the number of which varies according to the degree of heat, and the nature of its food, it ceases to eat, sleeps nearly two days, then frets, and is exceedingly agitated, becomes almost red with the efforts it makes: its skin wrinkles and shrivels up: it then throws it off a second time, and throws it aside with its feet. Thus, in three weeks, or a month, it has two new dresses. It begins then to eat afresh, and might pass for another animal; its head, colour, and whole form, being so very different from what they were before.

After having fed for a few days, it falls again into a kind of lethargy, in recovering from which it once more changes its garments. This is the third skin it has thrown off since it came out of the shell. It continues to eat a little longer; then, renouncing all food, it prepares itself a retreat, and draws off its reel a thread, with which it covers itself in the same manner as we would wind thread about an oval piece of wood. This covering consists of threads of silk extremely fine. It rests quietly in the cone which it has spun: and at the end of fifteen days it eats its way out, if it be not killed by being exposed to the heat of the sun, or that of an oven. The silk cones are thrown into warm water, and stirred about with twigs, to remove the

The silkworm.

loose threads ; and then the silk is wound off on a reel, made expressly for the purpose.

Thus, it is to a worm or caterpillar that we owe the luxury of our clothing. By means of that liquor, whence it derives its thread, it furnishes us with silk and velvet. This reflection is well calculated to humble us. What ! can we be vain of the *silk* we wear ?—Let us consider to whom we owe it, and how little we ourselves contribute to that which ministers to our vanity. Let us consider, that even the most despicable things have been created for the use and gratification of man. A worm, which we can scarcely deign to honour with a look, becomes a blessing to whole provinces ; a considerable object of commerce, and a source of riches.

Many persons resemble the silkworm in this : they pass a great part of their lives in feeding their bodies : but how few of them render themselves useful to the world by their labours ? Let us henceforward consecrate, with a noble zeal, our strength and talents to the good of our fellow creatures ; and incessantly labour to render them happy.

JULY IV.

THE RAINBOW.

WHEN the sun darts his rays on the drops of water that fall from a cloud, and when we are so placed that our backs are towards the sun, and have the cloud before us, then we see a rainbow. The drops of rain may be considered as small transparent globes, on which the rays fall, and are twice refracted, and once reflected : hence the colours of the rainbow, which are *seven* in number, and are arranged in the following order : *red, orange, yellow, green, blue, indigo, and violet*. These colours appear so much the more vivid as the cloud behind is darker, and the drops of rain fall thick and fast. The drops falling continually, produce a new rainbow every moment ; and as each spectator has his particular situation, from which he observes this phenomenon, it so happens, that no two men, properly speaking, can see the *same* rainbow. This meteor can last no longer than the drops of rain continue to fall.

If we consider the rainbow merely as a phenomenon of nature, it is one of the finest sights imaginable. It is the most beautiful coloured picture which the Creator has placed before our eyes. But, when we recollect that God has made this meteor a sign of his mercy, and of the covenant which he has condescended to enter into with man ; then we shall find matter in it for the most edifying reflection. When the rain is general, there can be no rainbow : as often, therefore, as we see this beautiful meteor, we may conclude, with certainty, that we need fear no deluge ; for to effect one, there must be a violent rain from all parts of the heavens at once. Thus, when

The rainbow.

the sky is only covered on one side with clouds, and the sun is seen in the other, it is a proof that these gloomy clouds shall be shortly dispersed, and the heavens become serene. Hence it is that a rainbow cannot be seen, unless the sun be behind, and the rain before us. In order to the formation of the bow, it is necessary that the sun and the rain should be seen at the same time. If the sky be too bright, no colours can be seen ; therefore, where this phenomenon appears, the horizon must be covered with dark clouds. Besides, there can be no coloured bow without the action of the sun, and the refraction of his rays. All these considerations should naturally lead us to pious reflections.

As often as we see the heavens adorned with the beautiful colours of this bow, should we not say to ourselves, How great is the majesty of God in every thing his hands have formed ! How great is his goodness towards his creatures ! Still we see that God remembers the world in mercy. Let all mankind bow before and adore him who keeps his covenant, and fulfils his merciful promises. He has not as yet destroyed the world ; and he never will *drown* it. Let his name be adored and blest to all eternity !

But there is another reflection which the rainbow should lead us to make : when we see it, we have the rain in our face, and the sun behind us. This is an emblem of life :—our faces may be bathed with tears, yet the Sun of Righteousness shall rise upon us with healing in his wings. *Malachi* iv. 2.

JULY V.

BIRDS' NESTS.

THE construction of nests shows us a multitude of remarkable objects, which cannot be considered with indifference by a reflecting mind, that delights in information.

Who can help admiring those little regular edifices, composed of so many different materials, collected and arranged with so much skill and labour ; constructed with so much industry, elegance, and neatness ; without any other tools than a *beak* and two *feet* ! It is not astonishing that man can erect great edifices according to all the rules of art ; especially when we consider that these artists are endued with reason, and that they have instruments and materials in abundance. But, that a bird, which is destitute of almost every requisite for such a work ; which has only its bill and feet, should, notwithstanding, be capable of uniting so much address, regularity, and solidity in constructing its nest, is what cannot be too much admired. But this deserves to be more particularly considered.

Nothing is more wonderful than the nest of a *gold-finch*. The inside is lined with cotton, fur, and fine silky thread. The outside is formed of thick moss : and that the nest may be less remarkable, and

less exposed to the eyes of passengers, the colour of the moss chosen for the purpose, resembles that of the bark of the tree or bush in which the nest is built. There are some nests in which the hair, down, straw, &c. are curiously crossed and interwoven. There are others the pieces of which are neatly joined, and tied together with a thread, which the bird makes out of fur, hemp, hair, but more commonly with spiders' webs. Other birds, as the *blackbird* and *lapwing*, after having made their nests, plaster them with a thin coat of mortar, which connects and fastens all that is below, and which, by the help of a little down or moss, which they attach to the mortar while soft, is very proper to render the nest warm. *Swallows'* nests are of a very different structure from all others. They need neither wood, hay, nor flax. They understand how to make a kind of plaster, or cement, with which they form for themselves and all their family, a neat, secure, and convenient lodging. In order to moisten the dust, of which they make their nest, they pass and repass close to the surface of the water, and wet their breasts; then with the dew which they sprinkle over the dust, they saturate it sufficiently, and work it up with their bills.

But the nests which deserve to be admired most, are those of certain Indian birds, which they artfully suspend to the branches of trees, to defend them from the ravages of several animals and insects. Each species of birds has its peculiar manner of placing its nest. Some place them in houses, others in trees. Some under the grass, some in the earth, but always in such a manner as may best contribute to their security, the rearing of their young, and the preservation of their species.

Such is the wonderful instinct of birds in the construction and disposition of their nests: and from this may we not certainly conclude, that they are not simple machines? How much industry and understanding, cunning and sagacity, activity and patience, do they manifest in the construction of their nests! And is it not evident, that in their work they propose to themselves certain *ends*? They make their nest like a hollow hemisphere, that the heat may be the better contained in it. The outside of the nest is covered with matters more or less coarse, not only to serve as a foundation, but also to keep out the wind and prevent the entrance of insects. The inside is lined with more delicate materials, such as wool, feathers, &c. so that their young may lie soft and warm.

Is it not a species of reason that teaches the bird to place her nest so as to be sheltered from the rain, and out of the reach of rapacious animals? Where has she learned that she is to have eggs, and that there must be a nest to prevent them from falling to the ground, and to keep them warm. Who has taught her that the nest must not be too large, as the heat would not then be properly concentrated about the eggs? and that it must not be too small, because, in that case, there would not be room sufficient to hold the young? How does she know to make the nest in just proportion to the number of the

young who are to be hatched ? Who has taught her the exact time, and to calculate so correctly, that she never lays her eggs before her nest is finished ? All that has been said hitherto, in answer to these, and similar questions, is quite unsatisfactory ; and does not account for these mysteries of nature. We have not a sufficient knowledge of the souls of animals to answer such queries.

But, however it may be, and of whatever nature the faculties of birds are, it is at least certain that they are the effect of a wise and powerful cause. And as the animals have not a capacity to know their Creator, let us use the reason with which he has endowed us, to increase continually in divine knowledge ; employing all our faculties to glorify our omniscient Creator !

JULY VI.

NATURE AN UNFAILING SOURCE OF PLEASURE.

LET us turn our eyes to whatever part of the creation we please, we every where find something that interests either our senses, our imagination, or our reason.

Universal nature is formed to present us with a multitude of pleasing objects, and to procure those varied pleasures which continually succeed each other. The taste we have for variety is continually excited, and always gratified. There is no part of the day but brings new pleasures, either to our senses or imagination. While the sun is above the horizon, plants, animals, and a thousand pleasing objects attract our notice ; and when the curtains of the night are let down, the majesty of the firmament transports and charms us. Every where nature labours to surprise us with new pleasures. The smallest worm, a leaf, or a grain of sand, presents us with subjects of admiration.

Blind and stupid we must be, if we are not struck with that infinite diversity, and do not acknowledge in it the goodness of the Creator. The same spring that waters the valley, quenches our thirst, pleases our ear, and invites us to sleep. The shady forest, which defends us from the intense heat of the sun, where we find such delicious coolness, and where we hear the varied melody of so many birds, nourishes also a multitude of animals which are, themselves, food for us. The same trees, whose blossoms delighted our eyes a few months ago, will soon produce delicious fruits ; and the fields, now covered with waving corn, will soon furnish us with plentiful crops.

Nature presents us with no object which is useful to us in one respect only. Providence has kindly chosen the green colour, which is so refreshing and friendly to the eye, to be the covering of the whole earth. This of itself would be sufficient to cheer our sight ; but variety has added new charms to it : hence that skilful blending of colour, those different gradations of light and shade, and those dif-

Nature an unfailing source of pleasure.

ferent degrees of green, from the brightest to the most dark. Every family of plants has its peculiar and constant colour. Landscapes covered with woods, brambles, pulse, grass, and corn, present us with a magnificent picture, where the tints of green are infinitely diversified, crossing and intersecting each other, and blending themselves so as to be insensibly melted into each other, and yet always in perfect harmony.

Every month of the year presents us with different plants and new flowers. Those which have served their purpose are replaced by others; and all coming in succession, prevent any void in the vegetable kingdom.

But, to whom do we owe all these numerous and diversified presents? Who is it that provides for our wants and pleasures with so much goodness and munificence?

“Go and ask universal nature: the hills and the vallies will tell thee: the earth points him out; and the heavens are a mirror, in which we may view his glories. Storms and tempests proclaim him, the voice of thunder, the rainbow, the snow, and the rain, publish his wisdom and goodness. The green meads, the fields covered with ripe corn; the mountains covered with forests, which lift their heads above the clouds; the trees laden with fruit; the gardens enamelled with flowers, and the rose with its brilliant dress, all bear the impress of his hands. The birds celebrate him with their melodious notes. The bounding flocks; the stag in the midst of the forests; the worm of the earth; the whale, the king of the seas, that spouts the waves on high, overturning and drowning ships; the terrible crocodile; and that moving mountain, the majestic elephant, the carrier of towers; all the innumerable host of animals which people the air, the earth, and the sea, declare the existence, and proclaim the glory of the strong God.”

How unpardonable should we be were we deaf to this general voice of nature! Let us, who are so favoured as to be the spectators of the wonders of our God, come and render him (in the presence of his creatures) that homage, gratitude, and adoration, which he has so just a right to claim from us. Let us not shut our ears against the voice of his grace! Let us not harden our hearts against the kind invitations of his goodness! Let us look around us; every thing brings his kindness to our remembrance; every thing prompts us to gratitude and joy. The rich lands, where our nourishment grows, the fields where the flocks feed, the forests which provide both shelter and fuel, the heavens which cover and enlighten us; all, all invite us to grateful joy. Let praise fill our whole souls. Let a due sense of our advantages, and the mercies of our God, accompany us both in public and in private. We shall find that no satisfaction is more solid, durable, or more suitable to human nature, than a calm pleasure which a contemplation of the works of the Lord affords. The more we study the beauties of nature, the more we shall be persuaded that God is a being of mercy and love; and that the Chris-

Nature an unfailing source of pleasure.

tian religion is a source of joy, and a continual motive to gratitude and adoration.

JULY VII.

REFLECTIONS ON A FLOWER GARDEN.

LET us now take a view of the flower garden, and consider the numerous and diversified beauties which are collected in so small a space. The art and industry of man have made it a superb theatre of the most beautiful flowers. But what would this garden be without care and cultivation! A wild desert, producing nothing but thorns and thistles. Such is *youth*, when a proper education is neglected. But when young persons receive the necessary instructions early, and are brought under proper discipline, they are like lovely flowers, whose appearance is now delightful, and who will shortly bring forth fruit useful to society.

Behold the *night violet*, which, towards evening, scents our gardens with its perfume! All other odours are absorbed in this. But it has no beauty, and scarcely resembles a flower. It is small, and of a gray colour, inclining to green, so that it scarcely can be distinguished from the leaves. Modest without show or pretensions, it perfumes the whole garden, though it can scarcely be noticed in the multitude, and it is difficult to believe that a flower of so mean appearance can produce an odour so sweet and pleasing. It resembles a person who is not beautiful, but who has a fine understanding, and whose outward deficiency Providence has amply compensated by the most durable gifts. The righteous man often does good in secret, and diffuses all around him the odour of good works. And when we wish to be acquainted with this beneficent man, we find that there is nothing peculiarly distinguishing in his external appearance or rank.

But in the *carnation*, both beauty and a fine scent are united; and it is, without doubt, the most beautiful of all flowers. It almost equals the *tulip* in its colours, and it surpasses it in the multitude of its leaves, and in the elegance of its form. A little bed of *carnations* perfumes a whole flower garden. This flower is the emblem of a person in whom sense and beauty are united, and who knows how to conciliate the love and respect of his fellow-creatures.

Let us now observe the *rose*: its colour, form, and scent, are all pleasing; but it appears to be the most weak and transitory of all; it soon loses those charms which distinguish it from other flowers. This is a useful lesson to those who have great beauty; and from which they learn not to trust in their charms, or be vain of their short-lived excellence.

In general, it is a melancholy thing to see the ground, in this beautiful season, covered with so many fallen, withered flowers. But we should not complain that Providence has given so little stability to

flowers. The world is a great theatre, on which the same actors do not always appear : it is right that those who have acted their part, should go off the stage to make way for others. The diversity of the works of God requires this ; and the diversity constitutes a great part of their perfection. Besides, the charms of novelty affect us most, therefore the former objects should give place to new ones. If the flowers preserved their splendour for a whole year, they would not please us so well as they now do by lasting only a few months. Their absence causes us to long for their return ; on the contrary, their continual presence would satiate and disgust us. After having considered an object in all points of view, we have in some sort exhausted its beauties, begin to feel indifference to it, and then aspire after new pleasures. The variety and continual succession of earthly goods, is a mean which Providence employs to make our lives continually pleasant.

Such is worldly happiness. All flesh is grass, and the glory of man is like the flower of the field ; the grass withereth, and the flower falleth off. The lilies and roses of a beautiful face wither, as well as the flowers of the garden ; and death leaves no vestige of them behind. Let us therefore wisely seek rest and happiness in solid and eternal good. Wisdom, piety, and the blessings of genuine Christianity, never fade. They are the inexhaustible source of an endless joy.

JULY VIII.

THE PHENOMENA OF A THUNDER STORM.

HOWEVER formidable the phenomena of a thunder storm may be, they have something so grand and remarkable in them, that the different effects produced by them deserve well to be examined. This examination is the more necessary, as we are often prevented, by excessive fear, from considering this majestic spectacle with sufficient attention.

When a stormy cloud, which is no other than a collection of vapours strongly electrified, approaches near enough to a tower, or a house, or to an unelectrified cloud, so that a spark issues from it, that explosion takes place which we term a clap of thunder. The lightning which we see is the electric fire, or, as some call it, the thunderbolt. Sometimes we see only a sudden and momentary flash ; at other times we see a train of fire in a zigzag form. The explosion which accompanies the lightning, shows that the vapours which form the thunder, being suddenly agitated and inflamed, dilate the air with violence.

After each electric spark, a clap is heard : this is the thunder, which is sometimes composed of many claps, or is prolonged and multiplied by echoes. There is always some interval between the flash and the

The phenomena of a thunder storm.

clap, and this may, in some degree, enable us to judge of the greatness and imminency of the danger, for it requires a certain space of time for the sound to reach our ear from the place of the cloud ; whereas, the lightning reaches our sight with inconceivable rapidity. As soon, therefore, as we perceive the lightning, we have only to count the seconds on our watch, or feel how often our pulse beats between the flash and the clap. Whoever can count about *ten* pulsations, or seconds, from the time he has seen the lightning till he hears the thunder, is a quarter of a league distant from the thunder cloud : for it is calculated that the sound takes the time of forty pulsations to pass through the space of a league.

Lightning does not always proceed in a right line ; it often winds about in all directions, takes a zigzag form, and sometimes does not flash till very near the ground. The matter of the lightning which reaches the earth, or is ignited near to it, never fails to strike. But, sometimes it has not a sufficiency of strength to reach us, and, like a bomb ill charged, it is dissipated in the atmosphere, and does no evil. When, on the contrary, the ignited exhalations come near the ground, they make terrible havoc. But as deserts, and uncultivated places, and places where there are neither houses nor inhabitants, occupy the largest part of our globe ; consequently, the lightning may fall many thousands of times without doing any real damage. The course of the lightning is peculiarly singular, and cannot be ascertained. It depends on the direction of the winds, the quantity of exhalations, the state of the earth beneath, and other circumstances.

Lightning goes in all directions, wherever it may meet with combustible matter. As one grain of a train of gunpowder, being ignited, communicates the flame to all the rest, till the whole train is set on fire ; so lightning proceeds on combustible matter, consuming every thing it meets with.

We may form some judgment of the power of lightning by the prodigious effects it produces. The heat of the flame is so intense, that it burns and consumes all combustible bodies ! it melts metallic substances, but often leaves uninjured the matters in which they were contained, when they are so porous as to give it a free passage. It is owing to the velocity of lightning that the bones of men and animals are calcined without the flesh being hurt : that the most solid buildings are beat down ; that trees are cloven, or torn up by the roots ; the thickest walls pierced through ; and stones and rocks are often broken, and reduced to powder.

Let us seriously reflect on these strange and formidable phenomena. How many wonders does one thunder storm exhibit ! We see a black and a gloomy cloud ; but this is the tabernacle of the Most High : it descends towards the earth ; but it is the Lord who bows the heavens, and comes down, having the darkness under his feet. (2 Sam. xxii. 10.) The wind arises, the storm begins ; but it is God who is in the whirlwind ; for he walketh on the wings of the wind. (Psa. civ. 3.) At his command the clouds are dispersed ;

and the hail, the lightning, and the thunder, fly abroad. Hear attentively the terrible sound of his voice, and the threatening which proceeds from his mouth. He darts his lightning from one end of heaven to the other, and his light to the extremities of the earth! Then a terrible voice is heard; the thunder roars, and the blow is already struck, before even the lightning is perceived. (*Job* xxvii. 2—4.) The Lord thunders in the heavens, he darts forth his lightnings, and sends them hither and thither: but though his terrible fires alarm the universe, his beneficent hand abundantly nourishes all his creatures.

JULY IX.

THE ANTS.

THE *ants*, as well as the bees, may be considered as a little republic, which has its peculiar government, law, and police. They live in a sort of city, divided into various streets; all of which terminate at different magazines. Their diligence and industry in procuring and using the materials they require for the construction of their ant-hills, are admirable. They all unite in digging the earth, and carrying it afterward out of their habitation. They collect a great quantity of stubble, grass, and twigs; of which they form a heap. At first sight, this appears very irregular; but in the midst of this apparent disorder, much art may be discovered, when it is examined with attention. Under the domes, or little hills which cover them, and which are always so contrived as to throw off the water, there are galleries which communicate with each other, and may be considered as the streets of this little city.

But what is most remarkable is, the care the ants take of their eggs, of the worms which come out of them, and of the nymphæ which are formed from the latter. They carry them carefully from one place to another; they feed their young, and remove, with the most tender solicitude, whatever might injure them. They even take care to maintain a proper degree of warmth around them. Their severe labour to collect provisions during the summer, has principally for its object the support of their young; for, as to themselves, they have no need of nourishment during winter, since they continue asleep, or in a state of insensibility, till the return of the spring. As soon as their young come out of the eggs, they are employed in feeding them; and this gives them a great deal of trouble; for, in general, they have many houses, and they carry their little ones from one habitation to some other, which they design to people. According as the weather is hot or cold, wet or dry, they bring their *chrysalises* towards the surface of the earth, or carry them downward. In mild weather, they bring them near the surface; and sometimes, after rain, they even expose them to the sun, or to a gentle dew, after a long drought. But when night, cold, or rain, approaches,

The ants.

they take their dear nurslings in their paws, and descend so far in the ground, that one is obliged to dig more than a foot deep in order to find them.

There are several species of these insects. The *wood-ants* never dwell but in forests and thickets, and do no damage to the fields. There are two sorts of these, the one *red*, the other *black*. Some of them lodge in the ground, in dry places, and ordinarily choose those parts where they find the roots of fir or birch trees, and there fix their habitation. Others establish themselves in old trunks of trees, high enough above ground to be out of the reach of its humidity. They make themselves apartments in the cavities of the trunk, and cover them with straw and such like matters, to shelter them from the rain and snow.

The *field-ants* are also either red or black, like the former, but much smaller : they settle either in cornfields, or common pasturages. In dry weather, they bury themselves very deep ; but in rainy weather, they elevate their habitations more or less, according to the degree of moisture : but when this abates, they fail not to return to their former subterranean habitations. It is farther worthy of observation, that the ants acquire wings ; and that towards autumn they are seen in great multitudes hovering over ditches, ponds, &c.

“ But do such mischievous insects deserve our notice, which make such havoc in our fields and meadows ? By their operations under ground, they make the earth hollow, tear it up, and hinder plants and vegetables from growing.” They are still farther censured. “ Ants,” it is said, “ are enemies to bees and silkworms ; do much damage to flowers, and injure the roots of young trees.” It is farther affirmed, that “ they devour the buds and shoots, and that, in getting under the bark of trees, they gnaw them to the quick, and destroy their growth.” Hence it is, that they are so cruelly persecuted and destroyed, wheresoever they are found. If the ants collected honey, though it were at the expense of a million of other creatures, they would, notwithstanding, be highly valued : but, because their labours injure a few useful plants, we imagine ourselves authorized to exterminate them. But supposing even that they do some hurt, are they the less worthy of our attention on that account ? Are no animals but such as are of particular use to us, worthy of notice ?

Let us cast aside this prejudice. Even the ants may contribute something to our instruction and amusement. The construction of their limbs, their industry, their indefatigable diligence, the police of their republic, their tender care of their young, and perhaps a thousand other properties, which as yet we know not, may convince us of the wisdom of that Being who is their Creator as well as ours. For there is not one of the works of God which is not good, or worthy our admiration ; however useless, or even injurious, some of them at first sight may appear. “ The Supreme Creator, by whom all things exist, has created nothing without design ; nothing but what

The ants.

has its proper use, and answers the end for which it was formed. The trees have not a leaf, the fields a spire of grass, nor the flowers a single leaf, which is useless : the mite itself has not been created in vain." Even the despicable ants may teach us this great truth ; and if we profit as we ought by their instructions, we shall never leave an ant-hill without having made some progress in wisdom and goodness.

JULY X.

HAIL.

HAIL is nothing but drops of rain, which, congealing in the air, fall down in pieces of a spheric, oblong, and angular form. Should it appear strange, that in the very warmest season of the year, vapours are found to freeze in the atmosphere ; let it be considered, that even in the greatest heats, the upper region of the air is cold, and often filled with snow. Were not this the case, how could the tops of high mountains continue covered with snow, even in the summer months ? In the hottest regions of America, the cold is so intense on the tops of the highest mountains, that the traveller is in danger of being frozen to death. From this excessive cold in the upper regions of the atmosphere, we should have snow even in summer, if the frozen particles did not melt before they reached the earth. When the particles of snow unite together, the drops begin to freeze ; and as in falling they pass suddenly through warm regions of the air ; it happens that before this warmth can have penetrated them, their cold increases so much as to freeze them entirely.

It might be supposed, that on the contrary, this cold should diminish in proportion as they pass through warmer air : but when, in winter, water which has been exposed to the open air, is brought into a warm apartment, what is the consequence ? It freezes and becomes ice, which would not have taken place had it been put in a cold room. This is precisely the case with the meteor in question. For, when those cold bodies pass suddenly through a warm region of the air, their cold increases to such a degree as to freeze them entirely. To this the volatile salts, which are more or less diffused through the atmosphere, contribute much. We need not, therefore, be surprised that storms are not always accompanied with hail ; for, in order to produce this effect, there must be an abundance of saline vapours to cause the drops to congeal suddenly. Although hail is more frequent in summer, yet it falls also in the other seasons. For, as in every season of the year saline exhalations may abound in the atmosphere ; consequently it may hail in winter, autumn, and spring.

The form and size of the hail are not always alike. Hailstones are sometimes round, sometimes concave, and hemispherical ; and often conic and angular. Their ordinary size is like that of a small

Hail.

shot; they are seldom as large as nuts. It has, however, been asserted, that some have fallen as large as a goose's egg. The difference we observe in the form and size of hailstones, may proceed from accidental causes. Winds, and especially those which are impetuous, and blow in contrary directions, doubtless contribute much to this. Besides, a hailstone in falling may meet with many other cold particles, which may considerably augment its bulk; and often several hailstones unite together and form one large one.

When hailstones are very large, they undoubtedly do inexpressible damage to crops, vines, fruits, and buildings: but this does not authorize us to look on them as a scourge from heaven; as a judgment or chastisement from the Lord. If a violent hail-storm lays sometimes acres of land waste, and breaks thousands of windows; such desolations may be nothing in comparison of the good which the storm produces. Hail manifestly cools the air in the burning heats of summer: the nitrous and saline moisture which it diffuses, contributes much to the fertilization of the earth. It is very remarkable, that although all the meteors appear to succeed each other, without the least regularity; and though in one year they are different from what they were in another; yet, notwithstanding this apparent disorder, constant fertility is produced.

Here again, God manifests his wisdom and goodness. May we glorify him in the hail and in the tempests, for his beneficent hand does admirable things, and never ceases to give us an abundance of food.

JULY XI.

THE UTILITY OF STORMS.

WE should consider the phenomena of nature so, that the wisdom and goodness of our heavenly Father may be clearly apprehended by our understanding, and make the deepest impression upon our heart: and this duty should appear to us the more indispensable, because it is so much neglected by a multitude of inattentive, ignorant, and ungrateful people. It is true, that God sometimes makes use of natural phenomena to punish the sins of men: but these particular cases do not prove that he does not propose chiefly, and in general, the benefit and welfare of the whole. Universal nature affords incontestable proofs of this. At present, let us consider a single phenomenon, which is well calculated to convince us of this; and concerning which, we have great need to have our ideas rectified.

Are we not, in general, accustomed from our youth to pronounce the words, *thunder* and *lightning*, with terror? Such is our injustice, that we never think but on those extremely rare cases, in which tempests have been prejudicial to a very small part of the universe; while we shut our eyes against the great advantages which result

Utility of storms.

from them to the whole of the creation. Alas! we should soon change our tone, if God, irritated by our murmuring and ingratitude, were to deprive us of the blessings which thunder and lightning produce. It is true, we are not capable of pointing out all the advantages resulting from them: but the little which we know may suffice to fill our hearts with gratitude toward our great Benefactor.

Let us represent to ourselves an atmosphere loaded with an infinity of noxious and pestilential exhalations, which are still more and more augmented by continual evaporations from terrestrial bodies; so many of which are corrupt and poisonous. This air we must breathe: the preservation, or destruction of our being, depends on it. The salubrity, or insalubrity of the air, brings life or death. We all know how difficult respiration is in the stifling heats of summer; and what uneasiness and anxiety we then feel. Is it not then a great mercy from God, which merits our utmost gratitude, that a salutary storm comes to purify the air from all that might render it injurious; that it sets fire to the saline and sulphureous particles, and thus prevents their dangerous effects; that it cools the air, and in restoring its elasticity, renders it proper for respiration?

Without such storms, destructive exhalations would be more and more corrupted and multiplied; men and other animals would perish by thousands; and a universal plague would render the earth a general grave-yard. Which then is most reasonable, to wish for, or fear storms? To murmur at the slight mischief which they sometimes occasion; or to bless God for the excellent advantages which they procure to the world at large?—Add to this, that not only men and animals profit much by the purification of the atmosphere from noxious vapours; but the vegetable kingdom also gets much advantage by it. Experience teaches us, that the rain which falls in a thunder-storm is more proper than any other for the fertilization of the earth. The saline and sulphureous particles which fill the atmosphere in the time of a thunder-storm, are brought down by the drops of rain, and become an excellent nutriment for plants: to say nothing of the innumerable multitude of little worms, seeds, and insects, which are precipitated by the rain; and which may, by the assistance of a microscope, be easily discovered in the drops of water.

Reflections of this kind may serve to moderate that excessive fear which we have of thunder; a fear which too plainly proves how little confidence we have in God. Instead of giving way to dreadful and terrific ideas, let us accustom ourselves to meditate on the majestic grandeur of a storm. Instead of conversing about the evils occasioned by lightning, let us speak of the great necessity and utility of thunder storms. Instead of praying to God to avert such, let us rather entreat him to send them from time to time; or else let us leave this entirely to that Supreme Being, who always governs the world with so much wisdom and goodness. As often as we see a storm, let us say, in the fulness of our heart, and with strong confidence: Lord God Almighty! it is thou who commandest the thun-

der, and directest the way of the lightning! We are in thy hand: thou alone canst save; thou only canst destroy. At thy command the tempest shall either fertilize or destroy our fields. Thou art great, O Jehovah! and thy power is inexpressible. How can we resist thee; or where can we fly to escape thy pursuing anger? But, art thou not our Father, and we thy adopted children! Thou speakest to us by the thunder; but it is to bless, not to curse us. Blessed be thou, O Lord, from eternity to eternity, and let all the people say, *Hallelujah! Amen.*

JULY XII.

REFLECTIONS ON THE EARTH, AND ITS ORIGINAL CONSTITUTION.

GOD has so constituted the earth, that it is fit for the production and growth of herbs, plants, and trees. It is compact enough to contain and hold fast the different vegetables, so that the winds cannot sweep them away; and yet it is light and moveable enough to permit the roots to sink downwards, and attract humidity and nutritious juices. When the surface of the earth is dry and parched, that very lightness causes the juices to ascend in the capillary tubes, to furnish the trees with necessary nourishment. Besides this, the earth is full of oily particles, and different juices, which serve for the growth of plants. And that all sorts of vegetables may grow and draw their subsistence from the earth, God has formed different kinds of earths, which serve us for a variety of purposes; such as potter's earth, clay, chalk, and gravel. Some serve to make bricks; others to form buildings, walls, ovens, &c. and others are employed in the potteries. There are also different earths, which are used in dying, and some are used in medicine.

Even the inequalities of the earth produce considerable advantages.—A greater number and diversity of animals and plants may live on the mountains. They serve also to break the violence of the winds; they produce a great variety of wholesome plants and fruits, which could not be so well produced on the plains. They contain in their bowels those metals and minerals which are so useful to us. It is from them that springs, and the greater parts of rivers produced by the melting of snows, by rains, and other vapours, proceed. The *stones* which are enclosed in the earth, serve for the construction of walls; and for the formation of *lime* and *glass*. As to *metals*, their uses are innumerable. Let us only consider the great variety of tools which our labourers and artists use; and the utensils and moveables of all kinds which are made of different metals, and which furnish us with so many conveniencies and ornaments. We also derive considerable advantages from the *hardness* and *weight* of these bodies.

No person can be ignorant of the great utility of *minerals*. *Salt* serves to season our food, and to preserve it from putrefaction.

 Reflections on the earth, and its original constitution.

And the sulphureous particles of bodies render them combustible. *Volcanoes* also, and *earthquakes*, whatever ravages they may sometimes occasion, are nevertheless useful and necessary. If *fire* did not consume the sulphureous exhalations, they would be diffused so much in the air as to render it unwholesome. Divers warm baths, and various minerals and metals, could not be produced without these. We may impute it to our ignorance, if so many things appear useless to us. At the sight of certain phenomena of nature, which are sometimes noxious, we should always recollect this maxim: if God now and then permit certain apparent imperfections to take place, it is that they may contribute to the greater perfection of the whole. To judge aright of the works of God, and to acknowledge his wisdom in them, we must not consider them in one point of view, but examine the parts separately, and then the whole combined. Many things, which we now consider as injurious, would then appear to be of incontestable utility: others, which appear superfluous, we should find to be necessary to the perfection of the whole; and we should see that their removal would leave a chasm in the empire of creation. How many things appear despicable to us, merely because we are unacquainted with their uses! Put a *loadstone* into the hand of a person who is ignorant of its virtues; he will scarcely condescend to honour it with a look. Let him be informed, that the progress of navigation, and the discovery of America, are owing to that stone, and he will speedily form a different opinion of it. It is the same with a million of things which we despise, or judge ill of, because we do not know their use; and see not the relations which they bear to the whole of creation.

Lord! the earth is full of thy goodness. All that is in and upon it, even the dust itself, is arranged in wisdom. How long have we travelled on earth; and how much of thy bounty have we seen! May we consider it as our principal duty, to apply ourselves more and more to know thee; and to pay thee that just tribute of gratitude and love, which we owe thee, for the various blessings we derive from the earth!

 JULY XIII.

ON THE PHASES OF THE MOON.

ALL observations on the moon confirm the opinion, that she has a particular motion, by which she turns round the earth from west to east. For, after having been placed between us and the sun, she retires from below him, and continues to go back towards the east, changing each day the point of her rising. At the end of fifteen days, she reaches the most easterly part of the horizon, at the time the sun sets with us. She is then in *opposition*. In the evening, when the sun retires, she rises above our horizon; and sets in the

morning nearly about the time the sun rises. If then she continue to describe the circle round the earth which she has begun and half finished, she will depart visibly from the point of her opposition to the sun, and be less and less distant from that luminary, rise later than when in opposition to him, till at last she has got so near as only to be discovered a little before his rising. This revolution of the moon round the earth, explains why she rises and sets at such different times; and why her phases are so different, and at the same time so regular. Every body knows that a globe, illuminated by the sun, or by a flambeau, can receive the light only on one of its sides. At first sight, we are convinced that the moon is a globe, which receives her light from the sun; when, therefore, she is in conjunction, i. e. placed between the sun and us, she turns the whole of her illuminated side to him: and of course her dark part to us. She is then consequently invisible to us: she rises with the sun in the same region of the heavens, and sets also with him; this is called the *conjunction* or *new moon*. But when the moon retires from under the sun, and goes back towards the east, then she has no longer the whole of her dark side turned towards us; a small part, a little border of the illuminated disk, comes in view. This luminous border is seen on the right side towards the sun, just at his setting, or even a little before; and the extremities, or points of this crescent, are turned to the left, facing the east. The farther the moon recedes from the sun, the more visible she becomes; till at the end of seven days, when she has performed the fourth part of her course, she discovers half of her enlightened face. The enlightened parts is then turned towards the sun; and her dark part casts no light on the earth. Exactly half the moon is then illuminated: the half of that half can only be the fourth part of her whole globe; and it is this fourth part which we see. Then the moon is said to be in her *first quarter*.

In proportion as the moon departs from the sun, and the earth is found nearly between them, the light occupies a greater space in that part of the moon which faces us; at the end of seven days, counting from the first quarter, she is almost directly opposite to the sun; and then her whole disk, perfectly illuminated, is presented to us. She then rises in the east, precisely at the moment when the sun sets in the west. Then is our *full moon*. The next day, the enlightened part is a little turned away from us; so that we see no longer the full enlightened face. The light seems to leave the western side by little and little; stretching over that part which does not face the earth. This is the *wane* or *decrease* of the moon: and the farther she advances, the more her obscure part increases, till at last, half the dark part, and consequently half of the light side, are turned towards the earth: it has then the form of a semicircle; and the moon is said to be in her *last quarter*.

Let us adore the wisdom and goodness of our Creator, who manifests himself to us in the phases and different aspects of the moon. By the admirable harmony which subsists between the motion of this

Phases of the moon.

planet on her own axis, and her motion round the earth ; it so happens that the moon always shows us the same half of her sphere which she has shown from the commencement of the world. For some thousands of years, this globe has finished her revolution in 27 days and 8 hours. Regularly, and at the same periods, she has enlightened at one time the nights of our climate, at another the most distant countries. With what goodness has it pleased the Divine Wisdom, to grant our earth a faithful companion to enlighten almost half our nights ! Alas ! we do not sufficiently value this wise appointment of the Creator. But, there is a people who know better than us how to estimate this advantage ; to whom the light of the moon is indispensable. Doubtless *they* feel more gratitude for this present from heaven than we generally do.

The continual changes of the moon, both in respect to her phases and her course, are a lively emblem of the revolutions to which terrestrial things are liable. Sometimes health, joy, affluence, and a thousand other blessings, concur to render us happy ; and we walk, so to speak, in brilliant light. But, at the end of a few days, all this splendour disappears ; and soon there remains only the sorrowful remembrance of the transitory and fickle blessings we have enjoyed. How earnestly then should we long to pass from this uncertain world to a region of felicity, where all the blessings which we shall enjoy shall appear to us the more excellent, because they are not subject either to corruption or decay !

 JULY XIV.

MINERAL WATERS.

WHETHER we consider mineral waters as to their formation, or in respect to the innumerable advantages derived from them : they are doubtless a precious gift from heaven. But in this, as in many other cases, we are inattentive and ungrateful. Even the places where these springs of health and life flow in abundance for us, are rarely what they should be ; places consecrated to gratitude and to the praise of God. For these and other blessings, let us hereafter endeavour to be more grateful to our heavenly Benefactor.

In the first place, the *sources* whence we draw the common salt, which seasons our food, deserve our attention. It is probable, that these sources derive their origin from that mineral salt, which the waters dissolve under the earth. The mineral hot-baths are not less remarkable. They are not only so very numerous, that in Germany itself nearly 120 are reckoned ; but the waters of them are so hot, that they must stand to cool, twelve, and sometimes eighteen hours, before they are fit to bathe in. Whence can this extraordinary heat proceed ? It is certainly not from the sun : were it occasioned by his influence, the water would retain its warmth only during the day.

Mineral waters.

while it was subject to the action of the sun : and would of course cool at night, and be cold during the winter. Nor can this heat, with any more likelihood, be attributed to subterranean fires ; for, still we should have to account for the medicinal virtues of these waters. Perhaps the most simple cause we can assign, is, that the waters passing through earth strongly impregnated with *sulphureous*, *pyritous*, and *metallic* substances, acquire this degree of heat. When the water falls into these quarries, the sulphureous and ferruginous particles which it dissolves, take fire by the friction and re-action of their principles, and communicate that heat to the water which runs over them.

Medicinal waters, and particularly those which are acidulated, are produced by dissolving and mixing with those mineral substances which they wash away. They are found especially in those places where there is an abundance of iron, copper, sulphur, and pit-coal. Hence it is, that their taste and effects are so different, in proportion as they are more or less impregnated with the above principles. They are *bitter*, when they spring through *bitter roots*, *impure resin*, *nitre*, or *copper*. They are *cold*, when they proceed from rocks, or when they are impregnated with *sal ammoniac*, *nitre*, *allum*, &c. Fatty and bituminous substances render them *oily*. *Sulphur* mixed with *acids*, renders them sulphureous.

Let us admire the inexhaustable riches of that Divine goodness, which has prepared for men wholesome fountains, which never grow dry. Mineral waters may, doubtless, have other uses : but it is incontrovertible, that they were formed for the health and preservation of men. It is for man that the Lord has caused these beneficent waters to spring out of the earth : let us therefore acknowledge his goodness, and feel deeply affected by it. Let those especially who have experienced their strengthening and salutary virtue, be deeply penetrated with gratitude and love to their heavenly Father. Let such glorify him, by imitating his example—ausing their riches to become *springs* of life and consolation to their necessitous brethren.

JULY XV.

THE CONTINUAL ACTIVITY OF NATURE IN THE VEGETABLE KINGDOM.

WHOEVER wishes to know why nature is never idle during the whole course of the year, need only reflect on the innumerable advantages which result from this constant activity. The vegetable kingdom was designed for the use of men and animals. Men receive both food and pleasure from it : animals receive food only. The beneficent Creator proposed to procure men both nourishment and comfort ; this is the reason why he has commanded nature not to produce all sorts of plants at once, but successively. In reality, if they all appeared at the same time ; none of the ends already mentioned

Activity of nature in the vegetable kingdom.

could be accomplished. How could men find time to get in their different crops, if all should come to maturity at the same time? How could they all be preserved, seeing there are many of them whose duration is very short, and which would speedily lose both their taste and virtue? What then would become of the pleasing sensations which they procure both to our eye and to our palate? What flavour would cherries and other summer fruits have, were we to eat them in the midst of winter, encompassed with snow and ice? Would not the wine itself be changed into vinegar, were the grapes to ripen in the height of summer? And what would be the lot of so many millions of animals, over whose preservation the Divine Being watches, as well as over that of men? How could they live, if all the productions of the earth came to their maturity at the same time?

There are a hundred species of insects which are nourished only by flowers: how could *they* exist, if the flowers lasted only one or two months? Could they collect enough to have always sufficient food? It is true, that the greater part of insects find none in winter; but they are so constituted, that, at the time when their provisions fail, they fall into a deep sleep, and so they require none. This could not take place in summer, because the heat would awake them. It is therefore certain, that if nature were otherwise arranged, men, as well as other animals, would suffer much, if not be destroyed by hunger: and we have good ground to assert, that the support of men and beasts is one of the principal ends which the Author of Nature has proposed, in establishing such a continual activity in the vegetable kingdom.

If we next reflect on the pleasures of *sight* and *smelling* which God designed for men; we shall find that in this respect, also, it is necessary that nature should be constituted as remarked above. It was not only necessary that she should bring forth her flowers in all their beauty, but that she should do this through the whole year, for the continual enjoyment of men. In spring, when men walk out into the fields to contemplate the different substances which the Creator causes to spring forth for their nourishment, they see the trees blossom in all their beauty. Towards summer, when they are principally occupied with their corn, a thousand beautiful flowers present themselves to their sight. They show themselves successively, and replace each other during the whole of that season in which men can enjoy this pleasure. Lastly, when the cold of winter takes place, and we shut ourselves up in our houses, nature produces other vegetables, which, though not very pleasing to the sight, have yet many and considerable advantages. From all this it appears, that the pleasure and comfort of man are some of the great ends which God has purposed in that arrangement of nature which we have already described.

Such is the plan, by which the Creator has disposed the vegetable kingdom. All is so regulated that men and animals may find sufficient

 Activity of nature in the vegetable kingdom.

nourishment ; and also, that the former might find as many pleasures and comforts as possible. In consequence of this law, certain plants produce their flowers and fruits in spring ; others in summer, and others in autumn or in winter. Thus, each has its appointed time, and appears precisely when it may be of the greater utility. Scarcely have the first accomplished their service, when the others begin to appear in all their beauty. We see many thousands of plants, and all follow the same law.

In this wise and regular order, all the things which God has created are found ; although the weakness of our understanding prevents us sometimes from discovering their uses and designs. Let us, therefore, bless our Creator, give him glory in all things, and acknowledge that, in all the revolutions which take place in the vegetable kingdom, God proposes always our comfort and happiness. With what gratitude should such reflections inspire us ! And what sweet satisfaction should we feel as often as we contemplate the beauties of nature in our fields, and in our gardens !

 JULY XVI.

THE BEAUTY AND UTILITY OF MEADOWS AND FIELDS.

THE sight of a large and beautiful garden, in these summer days, affords us a sensible pleasure which we find not in our houses, and of which we cannot, while confined to them, form even a just idea. But the pleasure which the most regular gardens afford, is not comparable to what we feel when we walk in the meadows and fields. The stately tulip, the elegant narcissus, the beautiful hyacinth, do not afford so much pleasure as the simple flowers which enamel a fertile valley. Whatever charms the flowers cultivated in our gardens may have, those of the fields and meadows are still more pleasing. In the former we observe beauty ; but the latter unite both beauty and utility. Is it not true, that in these long, uniform, and well gravelled walks, those bowers, thickets, and parterres, so gay and well proportioned ; is it not true, that we find ourselves confined and hampered in them ? Every place which confines our sight appears to set bounds to our liberty. We aspire to walk at large in the extensive fields and meadows : and we seem to become in a certain measure independent, and more at liberty, in proportion as our walk widens and extends before us.

In the country, in summer, fertile and beauteous nature varies her appearance every moment ; whereas in our gardens, so well ornamented, we always see the same objects. Even their order, proportion, and regularity, prevent us from being long pleased with them. In a short time we perceive no novelty in, and begin even to tire of them. On the contrary, the eye wanders with delight over objects continually varied ; and which extend themselves beyond even the

The beauty and utility of meadows and fields.

reach of sight. To afford us this satisfaction, the Author of Nature has ordained that in most places the earth should be smooth and even; but, that we might have distant agreeable prospects, he has encompassed our horizon with rising hills. He has done more still, he has spared us the trouble of cultivating and watering these flowery gardens. In them he has sowed an innumerable multitude of seeds, from which a verdure is derived which scarcely ever fades, or, if faded a little, is speedily renewed.

The prodigious multitude of plants which cover a field, are not for the sight only; each has its particular leaves, flowers, virtues, and beauties. It is true, that the same species of herbs is prodigiously multiplied in each field; but we scarcely take a step without passing over a hundred different kinds, each of which has its particular structure and use. This is one of the principal reflections which we should make at the sight of the fields. To the pleasure which this sight affords, our beneficent Creator has joined the most considerable advantages. The fields not only produce plants for our nourishment, but also innumerable simples, useful in medicine. But the greatest good afforded to us by the fields is, that they nourish, almost without expense, those animals which are so essentially necessary for us. The ox, whose flesh is our food, and by whose labour our grounds are cultivated, has no other food than the produce of the field. The horse, whose services are innumerable, asks only, as a recompense for his labour, the free use of the field, or a sufficient quantity of hay. The cow, whose milk is one of the greatest supports of life, requires nothing more. The pasture ground is the most perfect of all heritages: it is preferable even to cultivated fields; for the produce of the former is ever sure; and it neither requires seed nor labour; it requires only the small trouble of collecting that which it produces. Its productions are not casual, for it rarely happens that the pastures are ravaged either by drought or inundations.

But it is a melancholy thing that men, who are in general so inattentive to, and insensible of, the blessings of God, should be equally so in reference to this. We look upon grass, commonly, with contempt or indifference; probably because it grows under our feet, and requires no cultivation; and we do not consider the pastures to be of immediate use to us. But whatever the cause of our indifference may be, it is certainly without excuse. Would to God that, when we walk in the fields and plains, we had a sensible and grateful heart! That, at the sight of meadows, enamelled with flowers, we might be deeply affected with the goodness of the Most High, who opens his liberal hand over all the earth, and abundantly satisfies the desires of both men and beasts! O that we were deeply convinced that his goodness is every where; and that there is not a corner of the earth where he does not manifest the footsteps of his kind providence! Yes, all countries, all soils, the good and the bad, the sandy and the marshy, the stony and the moist, announce the beneficence of the Preserver of all things. The whole earth is one immense pasture,

The beauty and utility of meadows and fields.

where all living creatures may find nourishment, pleasure, and delight.

May we never hereafter consider these pasture grounds but with sentiments of gratitude and joy ! While we sit on a flowery bank, and cast our eyes around, may we be penetrated with gratitude and joy, and raise ourselves to thee, our affectionate Father, in songs of thanksgiving, and proclaim thy benefits ! “ How lovely and delightful are these flowers which encompass me by thousands ! Could Adam, in the terrestrial paradise, behold any more delightful than these ? Here troops of winged songsters celebrate the Lord of the universe ; there the verdant fields, and the flowers with which they are enamelled ; farther off, the thickets and forests announce the goodness of the Parent of Nature, and proclaim his unlimited munificence.”

JULY XVII.

THE MORNING TWILIGHT.

IT cannot be doubted that this phenomena, which we daily behold, is, equally with others, designed for the benefit of the world. Twilight is no other than a prolongation of the day, which prepares our eyes sometimes to bear all the splendour of the rising sun, and at other times to support the approaches of the night. The twilight is not always the same : it varies according to different climates and seasons. It continues longer at the poles than in the torrid zone. The inhabitants of that zone see the sun rise directly above the horizon, and sink in the same direction under the lower hemisphere ; so that he leaves them suddenly in the most profound night. On the contrary, the sun darting his rays obliquely towards the poles, and not sinking much below the horizon of the neighbouring people, their nights, though long, are almost constantly attended with twilight ; and, therefore, in some measure, luminous. It is a happiness for the former to have scarcely any twilight ; and it is not less so to the others to have an almost uninterrupted dawn.

As for us, who are placed nearly at an almost equal distance from the inhabitants of the torrid and frigid zones, we plainly observe that our twilight becomes shorter in proportion as our days shorten : and that it increases in proportion as the days lengthen. In the evening we enjoy an hour of twilight, and sometimes more, after the sun sets. Previous to his rising we have a twilight of the same length. This arrangement, so useful, we owe to the properties which God has given the air. He has encompassed the earth with an atmosphere which extends very high ; he has made such a proportion between the air and the light which pervades it, that, when the rays enter it perpendicularly, nothing disturbs their direction ; but, when a ray enters obliquely, or sideways, instead of passing through it in a di-

The morning twilight.

rect line, it is bent downwards, so that the greater part of the rays which pass into the atmosphere close to the earth, by this inflection, fall back upon it. For instead of pursuing their direct course in passing by the earth, they are reflected by the air : thus, when the sun approaches our horizon, many of his rays which pass by us, and are not sent directly to us, meeting with the mass of air which surrounds our globe, are bent in that mass, and sent back to our eyes ; so that we have daylight long before the sun himself appears.

This law of the refraction of light in the mass of air which surrounds us, is a work equally full of wisdom and goodness towards all the inhabitants of the earth ; but, it is an especial blessing to those who dwell in the frigid zones. Without the assistance of twilight, they must be for several months plunged in the deepest darkness. It is possible that this explanation of the origin of twilight, may not be altogether intelligible to some readers ; however, let us leave further details concerning this phenomenon to philosophers ; and let us content ourselves with considering it as Christians and reasonable beings should. To consider it profitably, we need no more intelligence than what ordinarily fall to the share of a common labourer, provided the heart be right with God, and earnestly desires to glorify its Creator. The simple, though unlearned Christian, is often wiser than the most eminent philosophers ; who, while they calculate and explain the twilight, lose sight of that supreme Being who gives to man the light of the day.

The simple Christian, falling on his knees at the arrival of the twilight, may be led thus to adore his Creator.—Father of the day, and Author of twilight, I exalt and bless thee at the sight of the first and last rays of the sun. With what tender care dost thou watch over the welfare of men ! Were I a labourer, I could, after having endured the intense heat of the sun, profit by the twilight to cut down my crops in the cool of the night ; I should probably praise thee with more gratitude. Were I a traveller, how pleasing must the morning twilight be to me ! Probably, while walking in its mild influence, I should bless Him who has formed it : while, on the contrary, at present, I pay too little attention to this blessing, and seldom think of praising thee for it. How cool and delightful are the summer mornings ! If there were no sun, no atmosphere,—if thou, O Creator of the sun and atmosphere, didst not exist, I should not desire to live. What am I saying !—If thou wert not, I could have no being. I praise thee for thy being, and rejoice in my own ; and bless thee that there is a world which thy beneficent hands have formed, and which thou hast condescended to enrich with so many beauties.

The pleasures of the country.

JULY XVIII.

THE PLEASURES OF THE COUNTRY.

COME, and let us enjoy those pleasures which are relished only by the wise. The pleasing light of the sun invites us to the field. There, the purest pleasure awaits us. Let us walk into a flowery valley, and sing a hymn of praise to the Creator.

How gently do the zephyrs breathe through every branch and leaf of those bushes ! Every thing before us bounds with joy, or resounds with songs of gladness : all seem invigorated, and animated with new life.

How do the ruffled woods, the valleys, and the mountains, which the summer has adorned by its gifts, delight the eye and rejoice the heart ! Their charms are not the produce of art : even the ornamented gardens are eclipsed by them.

The corn grows yellow, and begins to invite the reaper to prepare his sickle. The trees, crowned with leaves, spread their shade over the little hills and fields. The birds rejoice in their existence, and sing their pleasures ; their notes express nothing but joy and affection.

Each year renews the treasures of the peaceable husbandman : freedom, and a consciousness of his happiness, shine in his serene countenance. Neither hateful calumny, nor pride, nor the corroding cares by which the inhabitants of cities are enslaved, disturb the repose of his mornings, nor vex him with sleepless nights.

No place can prevent the wise man, who delights to exercise his senses and reason, from relishing the pleasures which are found in the bosom of the country. There, the rich pastures, the meadows covered with dew, the beautiful pictures which every part of nature presents, fill his soul with sweet delight, and elevate his heart to his Creator.

JULY XVIII.*

THE EVENING TWILIGHT.

THE evening twilight is that faint light which after sunset continues still to illuminate our atmosphere, particularly towards the west. It is partly occasioned by the refraction and reflection of the rays of the sun in our atmosphere ; and partly by the atmosphere of the sun itself, known by the name of the *zodiacal light*, which sometimes appears, but particularly in spring, towards evening ; and in autumn towards morning. When the sky is clear, we may see the smallest stars during the twilight : it continues from the time that the sun has entirely disappeared, till dark night : and its duration is ordinarily about two hours. In the island of *Senegal*, where the nights and days

The evening twilight.

are almost always equal, the twilight lasts but a few moments. This interval between sunset and dark night is scarcely a quarter of an hour. Thus, as soon as the sun is ten or fifteen degrees below the horizon, darkness is spread over the whole country, and it becomes like midnight.

About the 1st of March, and the 11th of October, our twilight is the shortest. When the northern declination of the sun, and the depression of the equator below the horizon, are such, that the sun descends only 18 degrees, the twilight then lasts the whole night. It is on this account that in these countries, in the summer solstice, we have scarcely any night; and that in the more northern climates, there is no night at all, although the sun is below the horizon. This takes place, when the difference between the depression of the equator and the northern declination of the sun is less than *eighteen* degrees. This happens in the greater part of Germany from the 17th of May to the 25th of July.

The advantages which we, and many other creatures, derive from the twilight, are very evident. To pass immediately from the broad day to dark night would be very inconvenient. So sudden a passage from light to darkness would wound, if not destroy, the organs of sight. Travellers overtaken by so sudden a night, must lose their way: and the greater part of birds be in danger of perishing. The wise Author of Nature has prevented all these inconveniencies, by giving our earth an atmosphere which hinders us from losing the light suddenly, although the sun is below the horizon. And thus, through the medium of the twilight, we pass, by insensible degrees, from day to night.

JULY XIX.

THE EPHEMERON.

THIS insect is named ephemeron, (i. e. half a day) because of the short duration of its life in the state of a fly. It is one of the most beautiful species of the small flies. It undergoes *five* transformations. First, the egg contains the principle of its life: secondly, a *caterpillar* proceeds from the egg: thirdly, this is transformed into a *chrysalis*: fourthly, the chrysalis becomes a *nympha*: and fifthly, this ends in a *fly*. This fly lays her eggs on the water, where the heat of the sun hatches them. A very small red worm comes out of each egg, which has a serpentine motion. They are found in abundance in ponds and marshes during the whole summer. But, as soon as the water begins to be cold, the worm makes itself a little sheath, in which it passes the winter. Towards the end of winter it ceases to be a worm, and enters into its third state, that of a chrysalis. In this state it sleeps during the spring, and by degrees becomes a beautiful nympha, or kind of mummy, something in the form of a fish.

Ephemeron fly.

On the day appointed for its metamorphosis, it appears stupid and inactive : in about six hours the head makes its appearance, and rises by degrees above the surface of the water. Afterward the body disengages itself slowly : till at length the whole animal comes out of its sheath. The new-born fly falls on the water, and remains some minutes without motion. In a short time it begins to revive, and moves its wings feebly. Finally, it moves them quickly, and tries first to walk, and then to fly. As these flies are all hatched nearly in the same moment, they are seen in swarms jumping and playing on the surface of the water for the space of two hours. The male and the female then seek each other, and unite for the space of two hours more. Then they begin again to skip and play, lay their eggs, and shortly after fall down and die. Thus they terminate their short life in about five or six hours, and never survive the day in which they were born !

Let the history of the life of these animals teach us how false the opinions are which we form of our lives in reference to eternity. Suppose that one of these flies had preserved its active and laborious life for *twelve* hours, and thus arrived at the most advanced age, relative to its companions, the greater part of which died at noon. If this very aged insect could speak, probably about sunset, a little before its death, it would thus address its assembled friends. "I now find that the longest life must end. The term of mine is arrived, and I regret it not : for old age is already become my burthen, and I can no longer discover any thing new under the sun. All that I have seen during the course of my long life has convinced me that there is nothing here certain or durable. A whole generation of our species has been destroyed by a violent tempest. The coolness of the air has carried off a great number of our sprightly youth. I have lived in the first ages of the world ; I have conversed a great deal with insects, much more respectable, robust, and intelligent than any of the present generation. I can assure you that the sun, which appears now not far distant from the earth, I have seen in the midst of the sky. In those ancient times, its light was more vivid than it now is : and our ancestors were more sober and virtuous than we are. I have seen many things, I have had long experience, and I have outlived all my contemporaries. My life began precisely when that sun arose : during countless years it ran its majestic course in heaven, and diffused the most intense heat every where ; but now that it is on the decline, and is going to set, I plainly foresee that the end of all things is at hand. O my friends, how much did I once flatter myself that my life should be eternal. How beauteous were the cells which I formed for my abode ! What hopes did I build on my good constitution, my vigour, agility, and the strength of my wings ! But, after all, I have lived long enough, and none of those which I leave behind will ever run so long, and so delightful a course as mine."

Thus might an insect speak which has lived on the earth nearly *twelve* hours. But, might not a man, who has spent *fourscore* years

Ephemeron fly.

in the world, use nearly the same language? Truly, the difference between *fourscore* years and *twelve* hours is nothing in reference to eternity. And, in general, do we employ our *fourscore* years to a much better purpose than this ephemeron fly is stated to have employed its *twelve* hours?

JULY XX.

NOTHING PERISHES IN NATURE.

WERE there any thing in the world which perished without good resulting from it, we might well doubt the wisdom of the Divine government. But, we have reason to believe, that in the immense circle of creation, not even the smallest grain of dust has ever perished; but that all things exist for certain purposes, each accomplishing, in its own way, the end for which it was designed.

The seed which drops off a flower is not destroyed: it is often carried away by the winds to make other flowers fruitful; or else it takes root in the earth, and becomes a plant. Other seeds, and fruits, are devoured by birds and beasts; they are digested, and mixed with their juices; part goes for manure to the land, the rest nourishes those bodies which are to become food for man and other animals. Certain things corrupt, and become decomposed, it is true; but, by this they become parts of some other substance, and serve, under a new form, to accomplish ends for which they were not proper in their first estate; for, in order to answer these ends, it was necessary that they should be prepared by different changes, and by a re-union with other substances.

The butterfly could never have produced its like, had it not been a caterpillar. No animal whatever, as we now see it, could have been produced, if its germ had not pre-existed in the first animal of its species. Nothing perishes in nature: things are only decomposed in order to appear under a new form, and become part of some other substance. Every grain of dust is, so to speak, the germ of new creatures, and holds its proper place in that chain of beings which have been produced for the perfection of the whole. If you take a handful of the sand you tread on, you perhaps take away the lives of millions of insects which were the inhabitants of this sand. Did we know properly the elementary particles of matter, we might be better able to determine what the other substances were in which they (so to speak) lay concealed, and into the composition of which they entered.

“But, may not abortions, or children which die immediately after they are born, be considered as creatures which perish without being of any use?” No, certainly. They fulfil, in their way, the designs of the Creator; and are prepared, by different revolutions, for their future state. Nature does every thing gradually. Man is first

Nothing perishes in nature.

an infant, and the tree a twig. Each creature employs its energy during its short duration, and prepares itself for a new state. The step which man must take to pass from the mere *sensitive* life of childhood to the *rational* life of advanced age, is certainly not greater than that which the infant takes from its mother's womb to the *sensitive* life. And we can no more say, that the infant has not fulfilled the design for which God created it, than we can, that the full grown man has not accomplished those purposes of his Maker here below, which he is not to fulfil till he becomes an inhabitant of heaven. Every creature answers the end of its formation, in a particular way, and according to its faculties. Like the wheels of a watch, some go fast, others go slow ; but all tend, directly or indirectly, to the end of their formation. All things develope and exercise their energies, and contribute something, according to their power, to the execution of the general plan which God has laid down.

We may meet with many things in nature which, at first sight, may appear useless ; and consequently may seem to have been produced without design. We may think that others have been entirely destroyed and annihilated. But let us not be too precipitate in our judgments ; and let us not be hasty to find fault with the ways of the Lord. Let us rather believe, that whatever we see, however strange and unconnected it may appear, is arranged in the wisest manner ; and that God knows how to accomplish his designs, when we, weak, ignorant mortals, cannot form an idea of the ends he proposes.

“ Let us be assured that the hand of the Lord has planned every thing with the utmost wisdom. Look around, all is connected : every thing is in its proper place, and nothing owes its situation to chance. There is not a thing in the world which is useless, even when it falls into dust. Nothing is lost from nature, nothing perishes in it : not even the smallest leaf, nor a grain of sand, nor one of those insects which the naked eye cannot discover ; nor any of those seeds which the breeze carries away. The majestic firmament, where the sun shines with so much splendour ; the dust, which sports in his beams, and which we respire without perceiving it ; all has appeared at the command of the Creator ; all is placed in the most proper situation ; all exists never to end : all is good and perfect in the world, which the Most High has created. And yet, rash and presumptuous man dares to find fault with the works of the Lord ! ” Let us not resemble these madmen : let us glorify God, and secure our own peace, in believing that of all which has been made, nothing perishes, nothing is useless. Even our bodies perish not : though they wear, and are continually evaporating, and at last shall be entirely decomposed in the grave ; though they become constituent parts, in the multitude of strange bodies, yet *they* shall have a resurrection to a life without end.

Difference of zones.

JULY XXI.

DIFFERENCE OF ZONES.

THE Creator having made our earth in a globular form, and having impressed on it a double motion, it necessarily followed, that the regions of the earth should differ from each other, not only in the temperature of the seasons, but also in the plants and animals which they produce. In certain countries of our globe, there is but one season, viz. *summer*, which incessantly prevails; and every day there is as hot as our warmest summer days. Those countries are situated on the middle of our globe; and occupy what is commonly termed the *torrid zone*. Those fruits which are most grateful to the smell and taste, are produced there; and grow no where else: and in it nature has poured out her richest gifts. In this zone, the days and nights are of an equal length during the greatest part of the year.

On the other hand, there are countries in which a cold more intense than that of our most rigorous winters prevails during almost the whole year. There are only a few weeks in the year warm enough for the few plants and trees which they have to grow or become green; but, in those *frigid zones*, neither the trees nor the ground produce such fruits as are proper for the nourishment of man. In these countries, the greatest inequality prevails between the days and nights: both last in their turn for whole months together.

The two *temperate zones*, situated between the *torrid* and *frigid zones*, occupy the greatest part of our globe. In these countries there are always *four seasons*, more or less distinctly marked, according as they approach to the *torrid*, or to one or other of the *frigid zones*. 1. The *spring*: in this, trees and plants bud and blossom: the heat is moderate, and the days and nights nearly equal. 2. The *summer*: in this, the fruits of the trees and fields ripen: the heat is more intense, and the days longer than the nights. 3. The *autumn*: in this, fruits and seeds fall, and the grass becomes withered: the days and nights are equal, and the heat diminishes daily. 4. The *winter*: in this, vegetation is almost totally suspended, the nights increase in length, and the cold becomes more or less intense.

The countries of the temperate zones are so situated, that in those which are near one of the sides of the torrid zone, the seasons are diametrically opposed to those of the other temperate zone. When it is winter in one, it is summer in the other, &c. In these countries nature seems to have produced the greatest varieties, not only in the productions of the earth, but also in animals. *Wine* is peculiar to those countries: for the vine cannot be cultivated in very cold, or intensely hot countries. Men, especially, have peculiar advantages in these countries. The inhabitants of the *frigid zone* are generally stupid and low in stature: those of the *torrid zone* are of a

 Difference of zones.

very weak constitution, have stronger passions, but less physical and intellectual energy than the inhabitants of the temperate zones.

However diversified the regions of our earth may be, the Creator has provided, by wise arrangements, for the well-being of those who inhabit them. He causes every country to produce what is most necessary, according to the nature of the climate. A worm, which feeds on the leaves of the mulberry-tree, spins for the inhabitants of the torrid zone that silk out of which they form their clothing; and a tree like a shrub, bears a kind of husk, or shell, filled with a fine wool, (cotton) of which light stuffs are made. On the other hand, cold countries abound in quadrupeds, the skins of which serve for clothing to the inhabitants of the north; and they are also stocked with thick forests, from which they procure wood in great abundance for firing. That the blood of the inhabitants, in a soil naturally hot, may not be too much inflamed, their fields and orchards afford them refreshing fruit; and that in such abundance, that they can spare ample provision of this kind to the inhabitants of other countries. In cold countries God supplies their lack of the fruits of the earth by vast multitudes of fish which the seas and lakes contain, and by the great number of animals which dwell in the forests; and though they are a subject of terror to men, nevertheless, they furnish not only excellent furs, and wholesome food, but also many implements for domestic use.

Thus, there is no region on the globe which does not experience the excellence and goodness of the Most High. There is no country, however poor or barren we may suppose it, where nature does not show herself sufficiently kind in providing, one way or other, the necessities and comforts of life for the inhabitants.

In every place, O beneficent Father! thy wisdom and goodness may be traced. Even the impassable deserts, and the rugged mountains, which fill a great part of Asia and Africa, contain monuments of thy wisdom and beneficent love. The countries where the snow and ice cover the earth, as well as the temperate zones, send songs of thanksgiving to thee. Father of beings! thy name is glorified in all languages. But it is in our climates that thou shouldst be particularly exalted, seeing thou hast favoured us more than so many millions of the other inhabitants of the earth.

 JULY XXII.

SINGULARITIES OF THE SEA.

IN general, the sea is considered only in a terrible point of view; without reflecting on the wonders and blessings it so visibly presents to us. We cannot, indeed, deny that the sea is a most formidable element, when its waves swell mountain high, and the tempest roars. In such cases, vessels are often driven far off their course, dashed to pieces by the waves, and swallowed up. Sometimes, the storm drives them against sandbanks and rocks, where they are entirely

wrecked. Whirlpools, or those masses of water which make the vessel turn rapidly round, and at last swallow it up, these gulfs and whirlpools are occasioned by great cavities in the sea, where rocks and opposite currents meet. No less dangerous are the *water-spouts*, which the wind lifts from the sea towards the sky. They hover in the air over the sea, and the wind causes them to twist and turn with violence. They often burst with a great crash, and do great damage; for when they approach a vessel, they mingle with its sails, raise it aloft, and shake it to pieces, or precipitate it to the bottom: at least, if they do not carry it away, they break the masts, tear the sails, and drown the vessel. Many ships perish by similar causes.

But we should be very ungrateful to pay attention only to the mischief which the sea occasions, without condescending to reflect on the magnificent works of the Lord; and on that goodness which shines forth even in the depths of the abyss. The first thing worthy of remark is the *saltiness* of the sea. It is such that a *pound* of seawater contains *two ounces* of salt. Sea-salt is lighter than that which we commonly use: nevertheless, it is not attracted by the air; nor is it diminished by the continual influx of fresh water. The cause of this is hidden from us. There may be mountains of salt in the sea: but if the *saltiness* proceeded from this, would not the water be saltier in some places than in others? but of this there is no certain proof. It is possible that brooks and rivers may bring down salt and nitrous particles into the sea; but what is this to the vast extent of the ocean? But whatever the cause of this saltiness may be, it is especially necessary for certain purposes. It is this which preserves the water from putrefaction; and renders it so weighty that the greatest burthens may be carried on it from place to place.

The *colour* of the sea also merits our attention. It is not the same every where. In all waters, the colour of the sky and of the bottom is seen. Deep waters are black—during a storm they become white and covered with froth: they are silvered, gilded, and shaded with the most beautiful colours, when the rays of the setting sun fall upon them. But besides all this, different insects, remains of marine plants, with the different substances which the rivers hurry down into the sea, vary its colour still further. When it is calm, it appears sometimes as if strewed with beautiful pearls. Often, as a vessel passes quickly through the waves, the water appears luminous, as if a river of fire followed her. These phenomena should be attributed, on one hand, to sulphureous and oily particles, and other inflammable marine substances: and, on the other hand, to shining insects.

A well known property of the sea is its flux and reflux. Each day, or rather in the space of twenty-five hours, the sea ebbs and flows twice. When the tide rises, it is called the *flux* or *flood*; when it falls, it is termed the *reflux* or *ebb*. This phenomenon is accompanied with many remarkable circumstances. There are always a flux and reflux in two parts of the earth at the same time; and these two places are opposite to each other: when our antipodes have

flood water, we perceive the same with us. The tide is always lowest when we are in the first and last quarter of the moon : and the highest tide takes place generally three days after the new and full moon. Nevertheless, there may be accidental causes why the tides are higher and lower at one time than at another. Though this phenomenon has not as yet, in every sense, been satisfactorily explained, it is nevertheless certain, that it is of great advantage to our globe ; because, on the one hand, the flux and reflux tend to purify the sea ; and, on the other, they favour the purposes of navigation.

But supposing all this, marvellous as it may be, is not sufficient to engage our attention ; probably the creatures with which the sea is peopled, may excite our admiration and surprise. Here a new world is discovered, and the number of creatures by which it is inhabited is prodigious. Aquatic animals are, it must be granted, not so varied in their species as the terrestrial ; but they surpass them in size, and live longer than the inhabitants of the earth and the air. The *elephant* and the *ostrich*, are small in comparison of the *whale*. This is the largest fish in the sea ; sometimes it is from 60 to 70 feet in length : it is as long lived as the oak, and consequently no terrestrial animal has so long a life.

If we can credit certain accounts, there are some animals in the sea larger even than the whale. This is a sort of crab, called *kraken*, which is said to inhabit the northern seas ; and which is half a German mile in circumference ! But who can even enumerate the different kinds of animals which people the surface and bottom of the sea ? Who can count their number, and describe the form, structure, size, and use of these different animals ? How infinite is the grandeur of Him who has created the sea !

This is the conclusion which we must naturally draw from such reflections. It is not without the most cogent reasons that the Creator has designed the ocean and seas should occupy two-thirds of our globe. The seas were not only to be great reservoirs of water ; but also, by the means of vapours, which are raised from them, were to become the source of rain, snow, and similar meteors. What wisdom is discoverable in the connexion the seas have with each other, and in the uninterrupted motion which the Creator has impressed upon them ! What is not less worthy our admiration is, that the bottom of the sea is nearly of the same nature with the surface of the earth. There are found in the sea, rocks, valleys, caverns, plains, fountains, rivers, plants, and animals. The isles of the sea are no other than the summits of a long chain of mountains. And when we consider that the sea is a part of our globe which has been less examined than the rest, we have reason to believe that it contains a number of wonders which neither the senses nor the understanding of man can adequately comprehend ; but which all proclaim the wisdom and power of the Most High. Let us adore our Creator, who has every where, in the ocean as well as upon the earth, established monuments of his greatness.

JULY XXIII.

THE DIFFERENT SHADES OBSERVABLE IN FLOWERS.

WITH a heart full of joy, I feel myself in the presence of the Author of all that exists; and endeavour to contemplate his works. I cast my eyes around, and see innumerable beauties. What a lovely assemblage of colours do I behold! How pleasing and diversified is their mixture! With what admirable art are those shades distributed! There a light pencil seems to have laid on the colours; here they are blended according to the nicest rules of art. The colour of the ground is always such as best serves to relieve the drapery; while the green which surrounds the flower, or the shade which the leaves cast upon it, serves to set off the whole.

In thus distributing and diversifying the colours, the good God seems to have had nothing else in view but to afford us agreeable sensations. How great and wisely arranged are all the works of the Lord! we may well admire the grandeur of the ends which he has proposed, and still more the wisdom of the means which he has employed to accomplish those ends. It is with difficulty that men succeed even in a single work: after many efforts (several of which are superfluous) we sometimes happen to succeed in a tolerable *imitation* of some one of the works of nature. But the Supreme Power has, in a moment, given existence to millions of beings, and has created them all in a state of perfection. The more we examine the works of art, the more defective they appear. But though men have been examining the works of God for nearly 6000 years, they have never been able to discover a single defect in the plan; nor can they imagine any thing which could further perfect the execution of it. The more we examine his works, the more we are astonished at their beauty; and we always discover new marks of grandeur in these masterpieces of the divine hand.

For my part, what fills me most with admiration in the shades and tints of flowers, is the *simplicity* of this beautiful work. We might suppose that the Creator must have employed an infinity of materials thus to embellish nature, and distribute to flowers and plants so many magnificent, rich, and splendid colours. But God has no need of painful preparations to make the creation a theatre of wonders. A single element in his hand assumes the most beautiful and varied forms. The moisture of the earth and air insinuates itself into the tubes of plants, and is filtered through a series of transparent pipes. This is what works all these wonders, and produces all the beauties which we perceive in the vegetable kingdom. This is the sole cause of the beauty, life, and odour of flowers. If each colour had its particular cause, the admiration of the spectator would be diminished; but we contemplate with pleasure, and are never weary of admiring, as an effect of the Divine Wisdom, a work which, diversified in its parts, is nevertheless simple with respect to its cause; and in which

we see a multitude of effects depending on a single spring, which always acts in the same manner.

At this moment, while we examine the diversity of tints which colour the flowers, we may feel more than ever the value of that reason with which we are endued. Without this faculty, we should be deprived of all the pleasures which the sight of these flowers afford us; and their existence in respect to us would be useless. But by the assistance of this faculty, we are capable of discerning the innumerable beauties of flowers; the infinitely varied blending of their colours; and the amazingly diversified shades which the meadows, valleys, mountains, and forests present. Through this faculty we not only can discern them, but so appreciate their beauties, as to cause them to contribute to our pleasures. We have further advantage still; we can make each flower lead us to the Creator: in each we may see the traces of his perfections; and make their various hues an occasion to glorify his holy name.

O our God and Father! how can we sufficiently adore thee for the inestimable gift of reason! It is right that, at the sight of thy works, we should bless thee for the faculty thou hast granted us to know their beauty, and to be able to enjoy them. Without this faculty, what should we be, and what would the world be to us!

JULY XXIV.

THE GREAT HEATS OF SUMMER.

ABOUT this time we ordinarily experience the greatest heats. Probably it will appear extraordinary to some, to hear that the sun, which now enters *Leo*, removes every day further from us. When we were nearer this luminary, the heat was moderate; and now that we are at a greater distance from him, the heat is intense. But does this phenomenon accord with the laws of nature? Certainly: and it is in the constitution of our globe that we must learn the cause. Lately the sun was nearer to us; but as his rays were not sufficiently strong to penetrate deep into the earth, we had only a moderate heat: nevertheless, in the space of a few weeks, the earth and the bodies upon it are so far heated, that even a less degree of action from the sun produces a greater effect than at the beginning of the summer, when he acted upon cold bodies.

This plan of nature displeases many. We hear them complaining of that burning heat which enfeebles their bodies, and renders them incapable of pursuing their business. But is it not very unreasonable to murmur against a plan, which, being formed on the immutable laws of nature, is therefore inevitable? Is it not a want of gratitude to our heavenly Father, which causes us to find fault with his government, which, in the end, never fails to promote the welfare of the world? And can any one seriously wish the season to be less hot?

What! because the heat incommodes us, would we desire that so many fruits, which, during the winter, are to be our support, should not come to maturity? I repeat it, our murmurs prove our ingratitude to our Creator, who ever softens and compensates all inconveniencies by certain advantages connected with them. For instance, the inhabitants of the western parts of Africa, particularly those of *Cape Verd*, and the island of *Goree*, are exposed, during the whole year, to the most intense heat of the sun; but their bodies are so constituted, that their health is not in the least impaired by it: and the winds which blow continually in these countries serve to temper and cool the air.

And has the Creator manifested less love to us? How unpardonable should we be, were we insensible of the proofs which he gives us of his kindness, even when the heat is most oppressive! Is it not a proof of his tender care, that the summer nights are so well calculated to cool the air? Night brings with it a coolness which prevents the dilatation of the air; and by compressing it, renders it more capable of acting powerfully on bodies. A single night revives the drooping plants, gives a new vigour to enfeebled animals, and refreshes us so that we forget the labour and fatigue of the day. Storms also, which spread so much terror, are, in the hands of the Creator, means of moderating and cooling the heat of the air. And how many fruits have we which possess the property of cooling the heat of the blood, and correcting the acrimony of the bile! these are succours the more precious, because the poorest among us may enjoy them.

Let us cease then to complain of the heat of the sun, or the load of suffering under which we languish: both belong to the plan of Divine Wisdom: both are assuaged by a thousand means, and should excite us to render to the Sovereign of the world, and the Arbiter of our lot, homage, honour, glory, and thanksgiving.

JULY XXV.

DIFFERENT INSTINCTS AND REMARKABLE PROPERTIES IN ANIMALS.

OF all parts of nature, the animal kingdom presents us with most wonders; and, to a lover of natural history, the different properties and different instincts of animals are a most interesting study. But, to a reflecting mind, it is something more than merely an agreeable object: and the operations of animals induce him to trace them back to that wisdom which cannot be fathomed, because it surpasses all human conceptions. Let this effect be produced in us, whilst we notice the singularities observable in certain animals.

The manner in which birds and insects lay their eggs, is worthy of admiration. The grasshopper, the lizard, the tortoise, and the crocodile, take no care either of their eggs or young. They lay their eggs on the ground, and leave the care of hatching them to the sun.

Other species of animals, by natural instinct, lay their eggs in those places where the young ones, the moment they come out of the shell, find a sufficiency of nourishment. The mothers are never mistaken. The butterfly which proceeds from the cabbage-caterpillar, never lays her eggs upon flesh ; and the fly which feeds upon flesh, never lays her's upon the cabbage. Some animals have so much solicitude for their eggs, that they carry them whithersoever they go. The spider called the *wanderer*, carries her's in a little silken bag. When they are hatched, they arrange themselves in a particular order on the back of their mother, who carries this burthen about with her : and continues for some time to take care of them. Certain flies lay their eggs in the bodies of living insects ; and sometimes in their nests. It is well known that there is not a plant which does not serve both to feed and lodge many insects. A fly pierces an oak leaf, and lays an egg in the hole which she has made : this wound quickly closes : the place swells up, and there appears an excrescence on the leaf, commonly called a *gall*. The egg that was enclosed in this growing gall, grows with it ; and the insect which proceeds from it, finds, as soon as it is born, both a habitation and nourishment.

The care which animals take of their young is almost incredible : and their love for them is often greater than for their own lives. With what tenderness do the quadrupeds nourish their young ! They cure their wounds by licking them ; they carry them from place to place, when any danger threatens ; they keep them near to themselves, defend, and guide them. If they are carnivorous animals, what pains does the dam take to get them a morsel of flesh ! With what art does she instruct them to pursue their prey, to divert themselves with it when they have taken it ; and, lastly, to tear it in pieces ! It is impossible to read, without being affected, the account of a bitch, who, while they were dissecting her, continued to lick her whelps ; as if she sought in this maternal care some relief to her own sufferings ! and set up a lamentable cry, the instant they took them away from her. Certain sea-animals, during a storm, hide their young in their bellies, and then let them out when the tempest is over.

Each species of animals has its peculiar inclinations and wants ; and the Creator provides for both. Let us, for example, consider the creatures which are obliged to seek their nourishment in the winter : and particularly aquatic birds. Nature has coated over their feathers with a kind of gummy oil, through which the water cannot penetrate : by this means they are never wet in diving, which would render them incapable of flying. The proportions of their bodies are different also from those of other birds. Their legs are placed more behind, that they may stand upright in the water, and extend their wings above it. That they may be able to swim, their feet are provided with webs, which, connecting the toes, serve them as oars. That they may readily dive, nature has given their bodies a peculiar construction : and that they may the more readily seize their prey, they

have a large beak, and a long neck. In a word, they are formed exactly in that way which their mode of living requires.

The *nautilus* is a kind of shell-fish, nearly resembling the shell-snail. When it wishes to arise, it places itself on the forepart of its shell ; and to render it light, it expels the water by a little opening. When it desires to descend, it withdraws itself into the bottom of its shell ; which, filling with water, becomes heavy, and sinks. If it wishes to sail, it artfully turns its shell, which becomes a little gondola, and then it spreads a thin membrane to the wind, which serves for a sail. Possibly it was from the *nautilus* that men first learnt the art of navigation.

It is the same with the actions of animals as with their make. The same wisdom which has formed their bodies, has arranged their members, and assigned them a common use ; it has also regulated the different actions which we see them perform ; and directs them to that end which it has proposed in their creation. The brute is led to this by the invisible hand of its Creator : it performs perfect works, which excite our admiration ; and appears to act by reason. It stops when necessary ; regulates its works according to circumstances ; and yet perhaps only follows the impulse of certain hidden springs which make it move. It is as an instrument, which cannot judge of the work it has executed ; but it is directed by the adorable wisdom of our Creator, who has circumscribed every insect, as well as every plant, within a sphere from which it cannot depart. When therefore we notice the different instincts and industry of animals, we should feel the spirit of veneration, and acknowledge we beheld a scene where the Almighty operator hid himself behind a curtain. But, he who contemplates the works of nature with seriousness, will discover the hand of God every where ; and an examination of the wonderful structure of created beings cannot fail to fill him with gratitude to, and reverence for, the Creator.

JULY XXVI.

THE HUMAN FACE.

THE exterior of the human body already proclaims man's superiority over every living creature. His face, directed towards heaven, announces this dignity, which is, in a certain sense, impressed on all his features ; so that we may in some measure judge from the countenance of man what his dignity and destination are.

While the soul enjoys uninterrupted tranquillity, the features remain in a calm and composed state : but when it is agitated with disorderly passions, the countenance becomes a living picture, where the passions are painted with as much energy as delicacy. Every affection of the soul has its peculiar impression ; and every change in the countenance is the true characteristic of the most secret emo-

The human face.

tions of the heart. The *eye*, in particular, expresses them so visibly, that it is impossible to mistake it: it is more particularly the immediate organ of the soul than all the other organs of sense. The most tumultuous passions, and the gentlest affections, are painted with the greatest exactness in this mirror. The eye, therefore, may be termed the true interpreter of the mind, and the organ of the human intellect. The colour of the eyes, and their quick or slow motion, contribute much to characterize the physiognomy. Our eyes are proportionably nearer to each other, than they are in any other living creature. The space which separates them in most animals, is so great, that it is impossible for them to see the same object with both eyes at once, unless it be at a very great distance.

The *eyebrows*, together with the eyes, contribute most to the formation of the countenance. These parts being of a widely different nature from the rest, their particular colour renders them more striking than the rest of the features. The eyebrows are the shade of the picture, which exhibits the drapery and colours. When the *eyelashes* are long and thick, they contribute much to render the eye more beautiful, and the look more pleasing. There are no creatures, except men and monkeys, which have both the eyelids adorned with eyelashes. Other animals have none on the lower eyelid; and in man, the upper eyelid has more than the lower. The eyebrows have only two sorts of motions, which they perform by the assistance of the muscles of the forehead. By the assistance of one they are raised; by means of another they are depressed.

The eyelids guard the eye, and prevent the cornea from becoming too dry. The upper one can raise and depress itself; the lower has little motion. Although we can move our eyelids when we please; yet, when grown heavy with sleep, it is impossible for us to keep them open.

The *forehead* is the most important part of the face; and one of those which contributes most to its beauty. In order to this, it must have a proper proportion; neither too full nor too flat, too great nor too small, and the hair properly planted on it, so as to form its outline and ornament.

The *nose* is that part of the face which projects most, and has the least motion. Indeed it has scarcely any, except in violent passions. It serves more for the beauty of the whole, than for any thing that it expresses by itself.

The *mouth* and the *lips* are, on the contrary, capable of many changes; and, next to the eyes, the mouth expresses the passions best, by the various forms it assumes. The *tongue* serves also to animate and set it in play. The redness of the *lips*, and the whiteness of the *teeth*, add to the charms of the face.

Hitherto we have only examined the human face relatively to the regularity and beauty of its component parts, without attempting to explain the different purposes and uses of these parts. But even under this one point of view, we may discover the infinite wisdom of

The human face.

Him, who, in all his works, takes care to unite beauty and utility. We, whose admiration is so often excited by the beauty which shines in our fellow-creatures, ought to sanctify that admiration, and even increase it, by reflecting on Him, whose wisdom and goodness are so conspicuous in the human frame. When we consider our face, it would be well to meditate in silence on the prerogatives which the Creator, in forming our features, has given us over all other living creatures. It would be well also to consider the great ends for which man was formed; concerning which even the features of his face may help to instruct him. His features were given him for the most noble purposes: purposes which the brute creation cannot fulfil. Our eyes were formed that they might take the most delightful prospect of the works of God: our mouth should sing the praises of our adorable Creator. In a word, all the features of our face should bear testimony to the uprightness of our hearts, and the rectitude of our sentiments.

Finally, the ravages which sickness and death make on the face, should prevent us from being proud of our accomplishments. This last consideration should lead us to meditate on the happiness which shall follow the resurrection of the just, whose bodies shall be transformed, embellished, and rendered capable of enjoying all the happiness of an eternal glory.

JULY XXVII.

ON THE GRAVITY OF BODIES.

GOD has endowed bodies with a force which acts at all times, in all places, and in all directions. If a body endeavour to move towards one point more particularly than towards another, it is said to *gravitate* to that point. For experience teaches us, that bodies tend downwards; or if they be at a distance from the surface of the earth, they will, if unsupported, fall down in a straight line. It is by no means in the body itself that we must seek the cause of its gravity; for a body that falls, remains in the state in which it fell, till some exterior cause displaces it. It is equally impossible that the air should be the cause of this gravity; since, being itself heavy, it must resist the velocity of falling bodies. We must, therefore, seek the cause of this gravity elsewhere. Perhaps the opinion which comes nearest the truth is, that the earth has the same power of attracting bodies placed at a certain distance from it, as the loadstone has of attracting iron. But it is possible that the cause of gravity is some foreign matter, which is distributed through all bodies.

Although we cannot perfectly determine the cause of this property of bodies, yet nothing is more evident than the advantages which result from it. Without gravity, we could not possibly move ourselves as we now do. Our centre of gravity is about the middle of our

body. When we lift up the right foot, we must bear this centre on the left. If we stoop forward, we are in danger of falling; but by advancing the right foot we prevent the fall, and make a step. Thus, our walking is, in some sort, a series of continually prevented falls; during which, the centre of gravity is preserved between our feet. Hence it is, that in going up a hill, we bend the body forward; and in going down, bend it back. We also stoop forward when we carry a burthen upon our shoulders; and lean back when we carry one in our arms. All this is regulated according to the laws of gravity, which direct the motions of animals when they walk, swim, or fly.

The same laws regulate the motions of those prodigious bodies which roll in the firmament. The sun attracts the planets; and each planet in its turn attracts its satellites; or, what amounts to the same, the planets gravitate towards the sun, and the satellites towards the planets: for bodies which revolve in a circle, would depart in a right line from it, if they met with no obstacle. The planets revolve in their orbits with astonishing velocity, and yet never deviate from their course, and the moon never flies off from the earth, though attached by no chain to our globe. It would seem, therefore, that so rapid a motion as that of the moon must project it far into unlimited space, were there not some power which continually impelled it towards our earth, and became a counterpoise to its centrifugal force. That power is the gravitation of the moon towards the earth. Were our earth itself, either higher or heavier than it is, what would be the consequence? It would either get too near, or too far off from the sun.—In the first case, no person would be able to endure the heat; in the second, the cold would be insupportable. Every thing on the face of the earth would be either burnt up, or frozen. What then would become of the seasons? And what would become of a thousand things, so indispensably necessary to the being and comfort of men?

Here again, O Supreme wisdom! we find a monument of thy wonders. By a cause so small, in appearance, thou givest motion to animals, and to the celestial bodies. By the laws of gravity alone, thou preventest even the smallest grain of dust from being lost, either from our earth or from any of the other globes. But it is in this that the greatness of thy power and wisdom consists, that often the greatest and most astonishing effects are produced by means which appear to us the most insignificant. In this respect, what an infinite difference is there between God and man! Vast preparations, and complicated means, are necessary for us to bring about the least important ends! He who discovers not the greatness of God here, must be very inattentive, or very ungrateful. May we endeavour to avoid both! May we consider the gravity of bodies as one of the means of our terrestrial happiness; and magnify our Creator with our whole hearts, for this wise ordinance!

Various effects in nature proceed from the same cause.

JULY XXVIII.

VARIOUS EFFECTS IN NATURE PROCEED FROM THE SAME CAUSE.

UNIVERSAL nature is an endless chain of causes and effects. And, as all the parts of the universe are connected with each other, every motion and every event depends on a preceding cause ; and this event becomes, in its turn, the cause of those effects which succeed it. The whole constitution of the world is well calculated to convince us, that not chance, but Divine art, and a wisdom beyond our conception, first erected this astonishing edifice, impressed motion on its different parts, and determined the great chain of events depending on, and succeeding each other. It is not difficult to acquire this degree of knowledge : for, though that which we have of the constitution of nature be very limited ; we nevertheless still see a number of important effects, derived from causes evident enough to the human understanding. Many natural phenomena may furnish us with examples of this.

What a variety of effects does the *heat of the sun* produce ? It does not only contribute to the life of an innumerable multitude of animals, but also to the vegetation of plants ; to the ripening of seeds and fruits ; to the fluidity of water ; to the elevation of vapours, and the formation of clouds, without which neither rain nor dew could fall upon the earth.

The *air* also is so constituted as to accomplish a variety of purposes at once. By means of this element, animal bodies are preserved, the lungs cooled, and all the vital motions acquire energy. By air the fire burns, and by it the flame is fed. By its motion and undulations, it quickly conveys all sorts of sounds to the ear. It gives a spring to winged animals, and enables them to fly from place to place. It opens man an easy path through the great deep ; the vast expanse of which he could not pass over without it. It is by the air that the clouds are suspended in the atmosphere ; till becoming too weighty, they fall down in rain. By the air the morning and evening twilight is formed, which tends to lengthen out the day : and without it, the gift of speech, and the sense of hearing, would be useless to us. All these advantages, and many more, depend on that air in which we live and breathe. This wonderful element, which encompasses our globe, which is too subtile to be perceived by the eye, and whose force, notwithstanding, is so great that no other element is able to resist ; is surely an evident proof of the wisdom of our Creator !

The force of *gravitation* alone, which subsists in all bodies, establishes the earth, preserves the mountains, and gives fluidity to the waters. It confines the ocean in its depths, and the earth in the orbit which was prescribed to it. It maintains each being in its proper place in nature ; and preserves, between the heavenly bodies, those distances which should separate them.

Various effects in nature proceed from the same cause.

Who can describe the various uses of *water*? It serves in general to dilate, soften, and mix a great number of bodies, which we could not otherwise use. It is the most wholesome of all drinks; the best nourishment of plants; and gives motion to our mills, and to a vast number of machines; procures us a multitude of fish, and brings us the treasures of other worlds.

How various and innumerable are the effects which *fire* produces! By it, solid bodies are either melted and changed into fluids, or become solid bodies of another kind. It causes fluids to boil, or reduces them into vapour. By it, heat is distributed through all bodies; and it contributes to procure animals not only life, but its principal comforts.

It is not only in the kingdom of nature that we see the most diversified effects, proceeding from the same cause; for, often in the moral world, one single propensity of the soul produces effects not less diversified. Let us, for example, consider the natural inclination we have to love our fellow-creatures. From this proceed the care which parents take of their children, the social union, the bonds of friendship, patriotism, goodness in those who govern, and fidelity in those who obey. Thus a single propensity, keeps each individual in the circle prescribed for him; becomes the bond of civil society, the principle, in the hands of God, of all virtuous actions, noble enterprises, and innocent recreations. All this proves that the materials which compose the world were not thrown together by chance, without relation to, or connection with, each other: but, on the contrary, that the world is a regular whole, which the Divine Power has arranged with infinite wisdom.

In every part, in every phenomenon of the visible world, some rays of ineffable wisdom blaze forth before our eyes. But how much escapes the most attentive examination, and the profoundest researches of the most enlightened genius! If we seek in an object traces of the Divine Wisdom; sometimes it shows itself on one side of the object, while it seems to hide itself on the other. Let not this discourage us from meditating on the works of God: and let us use the wonders which he does discover to us, to excite us to glorify his name. Then our hearts shall feel the truth and force of those words of David: "The works of the Lord are great: sought out of all those who have pleasure therein." *Psa. cxi. 2.*

JULY XXIX.

SOME DISEASES OF PLANTS.

VEGETABLES are subject to many diseases. Sometimes they are covered with a whitish matter, which sticks to them like dust, this is called the *mildew*. This does not proceed from insects, as is commonly believed, but from a stagnation in the juices, and a com-

mencement of corruption, which attracts the insects, and entices them to lay their eggs upon it. The stagnation of the juices is the first stage of corruption ; and it is supposed that this alone is sufficient to attract insects, because they are seen swarming by thousands, as soon as, through a natural or artificial cause, the circulation of the juices is stopped in a tree. Hence it is, that the weakest and worst situated trees are most frequently exposed to this malady. If the insects were really the cause of it, it would be impossible to produce it by art : whereas, if a tree be designedly wounded, or be deprived of the care it requires, this is sufficient to bring the *mildew*. On a tree thus artificially weakened, thousands of insects settle at once : while the neighbouring trees are free from them. Thus, this corruption should no more be attributed to insects, than that of flesh. It seems merely to be occasioned by the stagnation of juices ; an accident which many circumstances may occasion.

Often a matter which resembles dew, but is gluy, sweet, and corrosive, scorches and mars the plants : this is called the *honey dew*. It was imagined that insects extracted this gluy matter from vegetables ; or that bees brought their honey thither. But many experiments have proved that this matter falls from the air in the form of dew. In some countries it lies in little drops on a number of vegetables of different kinds ; and in the space of a night, it covers almost all the leaves of a long range of trees, on which before none was perceived.

Possibly this dew may be formed from the exhalations of flowers, and the blossoms of trees ; from which the bees know how to extract such good honey ; and if it fall in some places more than others, it must be owing to the direction of the wind. Perhaps also, this matter may be the effect of a disease in plants whose juices are vitiated, and which may attract insects as the *mildew* mentioned above : for the weakest ears, boughs, branches, bushes, and trees, are those which are most subject to this disease. It has also been observed, that the leaves on which this species of dew falls, spot, blacken, and spoil ; and it is very probable that this substance is the cause of it.

Here also we find traces of the wisdom of the Creator ; for, seeing the insects have need of nourishment, it is for our benefit that they should be obliged to seek it on those vegetables which, on account of their diseased state, would be unprofitable or injurious to us. This is a new proof of the particular provision which God made for man when he established the world. It is owing to this wise arrangement that these animals take nothing of what is necessary for our support ; but, on the contrary, attach themselves to that which would be destructive to us. It is a truth, that in the economy of nature, each plant, tree, and animal, serves for the support of different species of animals. We avenge ourselves on those which are troublesome to us by seeking to destroy them : probably we should be rather led to preserve them, if we consider how useful they are, and how little *real* damage the greater part of them occasions.

JULY XXX.

MEANS OF SUBSISTENCE WHICH NATURE PROVIDES FOR ANIMALS.

IT is a great proof of the goodness of the Divine Omnipotence, that a sufficiency of food is provided to support all the living creatures with which the world is stocked. It is not indeed astonishing, that the countries under the temperate zones should furnish subsistence for their inhabitants : but, that it should be the same every where else, even in places where we could least expect to find food and pasture, and that the necessary aliments should ever be found in sufficient quantity to support so many species of animals, is what must be attributed to the tender care of a wise Providence. We may first observe, that God has proportioned sustenance to the wants of the animals which are to consume it.

This supply is superabundant almost every where : but this profusion is not such, as that the aliments corrupt and get spoiled, for this would be prejudicial to the world. What is most remarkable in this matter is, that among so many sorts of food, the most useful and necessary are in general the most common ; and such as are most easily multiplied. As there are a great many creatures which feed on grass, the fields, which are numerous, are well covered with grass and wholesome plants, which grow of themselves, and easily resist the intemperature of the air. Is it not a matter worthy of attention, that corn, which is the principal food of man, can be cultivated with so little trouble, and multiplies itself in so astonishing a manner ? For instance, if a bushel of wheat be sown in a good soil, it will produce *one hundred and fifty*.

Is it not a very wise appointment of the Creator, that the taste of animals should be so different ; that some love to feed on herbs, others on corn : some on flesh, others on worms, insects, &c. Some are easily satisfied, others are insatiable. If all sorts of animals must have had the same kind of food, the earth would be speedily turned into a vast desert. Those different tastes which we perceive among animals, is a certain proof, that it is not by chance that they are attached to this or that sort of food ; but is owing to natural instinct, which causes them to prefer those aliments which are best suited to the nature of their bodies. By this means, all the productions of the earth and sea are well distributed. Not only every living creature is richly provided for ; but even the things which, becoming corrupt, would be injurious, serve for a useful purpose : for, the most wholesome plants would perish, and the dead carcasses of fish, birds, and beasts, would exhale a most deadly poison, without this wise appointment of the Creator, who has ordained, that various animals should find in these things an agreeable nourishment.

Food offers itself spontaneously to the greater part of beasts ; notwithstanding, they require great art to discern it ; and must be prudent and cautious in their choice. Their aliments are so prepared,

 Subsistence which nature provides for animals.

that what is useful to one species, is hurtful to another, and turns to poison. After many experiments, botanists have found that *cows* eat of 276 kinds of grass and herbs; and reject 218. That *goats* use 449, and leave 126 untouched. That *sheep* feed on 387, and that there are 141 which they will not eat. That the *horse* takes 262, and rejects 212. That *swine* are contented with 72, and that there are 171 which they will not feed on. Other animals are obliged to seek their food laboriously, and afar off: to dig for it in the earth, or to collect it from a thousand places where it is scattered, or even to draw it from another element. Several are obliged to choose the most favourable time of the night, that they may satisfy their hunger in safety: others have to prepare their food, take the seeds out of their husks, break those which are hard, swallow little stones in order to assist digestion, take off the heads of insects, on which they feed, break the bones of the prey they have taken, and turn the fish which they have seized that they may swallow them by the head. Many would perish, did they not collect in their nests provisions for the future. Others could never catch their prey without having recourse to wiles and cunning, spreading their nets, laying their snares, and digging holes. Some pursue their prey on the land, others in the water, and others in the air.

The more the nourishment of animals, and their manner of procuring it, are diversified, the more we should admire the wisdom and goodness of God in the preservation of his creatures. Let us reflect on the glorious perfections of our heavenly Father. How many occasions do we find to magnify his name!

 JULY XXXI.

A HYMN OF PRAISE.

GLORY be to God Most High! Magnify the Lord, O ye heavens! Who could not delight to praise his name? Thou sun, exalt his power; thou moon, magnify thy Author; ye stars, the brilliant flambeaux of the night, glorify our God! Ye clouds, which he suspends in the air, proclaim his greatness! He has spoken, and ye received existence! Let all beings rejoice in his goodness! Celebrate him, all ye inhabitants of the earth! Let the monsters from the depths of the abyss, praise their Creator! Let the fire proclaim his power, and the mountains his strength! Let the ascending vapours be an incense to his praise! Let the tempest, which terrifies by its noise, while it is a blessing to the world, be a hymn in honour of his power! Ye peaceful flocks which feed on the grass of the fields; and ye trees laden with blessings, celebrate the beneficent God! Let the notes of the airy songsters; let the industry of the insect which crawls on the earth; and let all that exists, magnify his Majesty! Great is the Lord Jehovah! Let us praise and exalt his name! The heavens and the earth are full of his glory.

JULY XXXI.*

VARIETIES IN THE STATURE OF MAN.

THE whole height of the human body varies considerably, and whether more or less, is here of little consequence. The ordinary height is from five to six feet. Some of those who inhabit the northern countries along the frozen seas, are less than five feet high. The shortest men we know of, are those who inhabit the tops of the mountains in the island of *Mudagascar*. These are scarcely four feet high. Many of these dwarfish people came originally from countries where the inhabitants are of the ordinary size ; and the principal cause of their degeneracy must be sought in the nature of the climate where they now live. The excessive cold which prevails there during the greatest part of the year, causes both vegetables and animals to be less than in other places : and may it not have the same influence on men ?

On the other hand, there are nations of a gigantic size. Of these the most celebrated are the *Patagonians*, who dwell near the Straits of Magellan. We are assured that they are from seven to twelve feet high. It should not appear impossible that there are people of a larger size than Europeans : for, besides the traces which we have of this in antiquity, we have seen, in our own climate, men from six feet and a half to eight feet high, and upwards, who were, notwithstanding, in general, well made, healthy, and fit for all those exercises and labours which require activity and strength.

Adorable Creator ! thy wisdom is evident also in the varieties of the human form. All that thou hast made, in the animal, vegetable, and mineral kingdoms, has been by weight, number, and measure. Every thing bears thy image : the *dwarf*, as well as the *giant* ; the *blade of grass*, as well as the *oak* ; the *worm*, as well as the *elephant*.

AUGUST.

AUGUST I.

A MEDITATION ON THE WORKS OF NATURE.

O FATHER, Creator of the universe, and Preserver of every living creature ; how great is thy majesty ! How many are the wonders which thou presentest to the eyes of man ! It is thy hand which has spread out these heavens, and strewed them with stars !

To-day, I yet behold the sun coming forth in all his splendour, to re-animate nature. To-morrow, it is possible I shall not enjoy the pleasure of hearing those birds which now cause the woods, valleys, and fields, to resound with their melodious notes. I feel that I am mortal, and my life withers like the grass of the fields : it fades as the flower cut off from the branch where it grew. Who can tell how soon that word of the Almighty shall reach my ear : Man, return to thy dust !

When the grave shall have swallowed me up, when silence and darkness shall have encompassed me about, when worms shall have fed on my mortal body ; what will then remain of all my earthly possessions ? shall not all be lost to me, though all had here succeeded according to my wishes ; and I had enjoyed unmixed happiness ?

O how foolish should I be, were I to attach myself to the perishing goods of this life ! were I to aspire after great riches, or be ambitious of empty honours ; or if, permitting myself to be dazzled by vain splendour, envy and pride should find access to my heart !

If, too eager in my desires, I have pursued what I ought not to have aspired to, I humble myself before thee, O God ;—Behold me, O my Maker ; and let that which thy wisdom has appointed, be done unto me !

Foolish man, who is led astray by pride, prescribes laws to his Creator ! He dares to blame the purposes of Eternal Wisdom ! And thou, Almighty Friend of Man ! thou lovest him more than he loves himself, when thy goodness denies him those deceitful enjoyments which are the objects of his wishes.

When in the morning, on the green turf covered with dew, every thing presents itself in a pleasing form ; when the wings of the night have cooled the sultry air of summer ; Wisdom thus accosts me : O mortal, why dost thou torment thyself with anxious cares about the future ? Why dost thou abandon thyself to wretchedness ? Is not God thy Father ? Art not thou his child ? Shall not he who formed thee, take care of his own work ? The plan of thy existence is not limited by earth ; it takes in eternity ! Thy life is but a moment, and the longest earthly felicity is no more than a pleasing dream. O man, God has made thee immortal.

The contemplation of immortality elevates us above the earth, the universe, and time itself. Manifest thyself in my heart, when, seduced by false views, I am ready to depart from the paths of virtue !

The roses which crown the head of the vicious, shall soon fade ; his shameful enjoyments dishonour him, and repentance succeeds them. I am only a sojourner upon earth ; and immortal joys alone are worth my pursuit.

O Thou, who delightest in dispensing blessings, give me a heart which loves nothing but goodness ; a heart where virtue and holiness reign. Let others covet worldly prosperity ; I ask of thee, my God,

A meditation on the works of nature.

grace to be contented with my situation, to make me faithful in the discharge of my duty, and deserving the name of a wise man and a Christian !

AUGUST I.*

AN EXHORTATION TO PRAISE GOD.

MY soul, bless the Lord ; and let all that is within me praise his holy name ! Bless the Lord, O my soul, and forget not his benefits ! Is he not thy Father, and thy Sovereign ? Is it not he who has given thee thy being ; who has created thee immortal, intelligent, and capable of knowing and praising Him ? Is it not the Lord who has formed thy frame, that wonderful assemblage of flesh and veins ; who maintains thy breath, and keeps all thy bones that not one of them is broken ? To whom art thou indebted for life, health, and happiness ? Is it not thy God ? Look behind on the path in which he has led thee from the first moment of thy existence : is it not covered with monuments of his goodness ?

Being favoured by thy Creator, lift thy eyes and contemplate the innumerable benefits which surround thee : but at the same time fix thy thoughts on futurity ; and see what faith discovers beyond the grave. Endeavour to conceive the ecstasy thou shalt experience, when freed from evil and imperfection : immersed in holy and heavenly joy, and clothed with a glorious body, thou shalt approach God thy creator and preserver ; and Jesus, who has purchased thee this celestial happiness, who shall place thee upon his throne, that thou mayest eternally enjoy his glory !

Prostrate thyself, child of God, and inheritor of eternal happiness ! Prostrate thyself, and let emotions of the most lively gratitude fill thy whole heart ; and begin here below the occupation of eternity ! Praise the Lord, O my soul !

AUGUST II.

VEGETATION OF THE STALK OF WHEAT.

THE wheat plant is composed of the principal stem, the stalks growing out of the sides, and the branches which spring out of those. The stalk begins to form as soon as four green leaves make their appearance. If the little plant be then taken, and the under leaf be cautiously pressed or separated, a little white point will appear, which by degrees grows into a stalk, and the root appears under the first leaf. The white point grows out of the substance of a knob, unfolds itself into green leaves, and produces a new point at the side. But these different points, and the stalks which grow out of them, are not all designed to bear fruit : several of them wither and fall off.

Vegetation of the stalk of wheat.

When the principal stem has gotten a little growth, a considerable revolution takes place in the plant ; all the sap is then employed in the formation of the ear.

But before this, when the plant begins to vegetate, four, sometimes six leaves, are observed to spring from so many knobs : these prepare the nutritive juice for the ear, which may be seen in miniature, when, in spring, we divide a stalk in the middle. Even in autumn, this ear may be seen like a little cluster, to which the knobs are still very closely united. When the plant begins to put forth his seed, the two upper leaves of the stalk join together, enclose the ear, and protect it, till it has acquired some degree of consistence. Before this, all the knobs, and particularly the two last (still very soft) are very close together ; and the intervals which separate these knobs are, of course, very small ; but as soon as the ear has pierced through its coats, all these parts lengthen, and the leaves give them up all the juices they contain. The knobs harden by degrees, the lower leaves dry up, and the sap which nourishes them is now employed only in strengthening the stalk.

After all these preparations, the blossom appears : which furnished the grain with its best nourishment. This blossom is a small white tube extremely slender, which comes from the seed leaf. Many other little tubes encompass this bag : they are first yellowish, afterward they grow brown, and finally become blackish, before they fade and fall off. The principal use of these tubes is to nourish a little tuft, which may be seen in the seed-bag. As soon as the corn has done blossoming, the grains which contain the germ are seen, and which come to their perfection a long time before the mealy substance appears. This substance gradually multiplies, whilst the sap collects round a part extremely fine and delicate, resembling down. This down, which continues after the blossom, serves, among other uses, to support the opening of the great canal or tube which goes through the corn. The fruit ripens as soon as it has attained its full growth : then the tube and the ears begin to grow white ; and the green colour of the seeds changes into a yellow, or dark brown. These seeds are, notwithstanding, very soft as yet ; and their mealy part contains a great deal of moisture : but when it arrives at its full maturity, it becomes dry and hard.

We cannot sufficiently admire that wisdom of God which appears in the formation and growth of a stalk of wheat. Those who are accustomed to reflection may see it in the smallest tube. For instance : the leaves which surround it, before it has acquired its natural size, have their use ; and it appears that the wisdom of the Creator has placed them round the stalk for the same purpose that an architect erects a scaffolding about the building which he intends to rear ; and which he pulls down when the building is completed. For, as soon as the tube has acquired the length and consistence which it ought to have, the leaves which protected it dry and perish. Whole months pass away before the ear ventures to expose itself

Vegetation of the stalk of wheat.

to the action of the air; but as soon as all is prepared for the formation of the fruits and flowers, they appear in a few days. With what skill are the tubes and ears constructed! If the first were higher, the nutritious juice could not so well penetrate them. If, on the contrary, the grain had been placed lower, birds, and other animals, could easily reach to, and destroy it. If the stem were weaker and thinner, the wind would break it; and if it were stronger and thicker, small animals might lodge in it, and the birds perch on it and pick out the grain.

Merciful and beneficent Father! may all those who at present walk around the fields of wheat, and behold, with joy, that forest of waving ears, feel, at the sight, all those sentiments of admiration and love which thy wisdom and goodness should naturally excite. May each of those, for whose sake thou causest these abundant harvests to ripen, render the thanks which are so justly thy due!

AUGUST III.

THE DOG-DAYS.

THE sun appears to have not only a diurnal motion, which conveys it not only from east to west, and which causes day and night; but also another motion from west to east, by means of which it returns at the end of 365 days to the same star in the heavens, from which it appeared to have been removing for six months; and to which it seemed to approach for the other six.

Hence ancient astronomers divided the seasons by the stars, which the sun seemed to pass in his annual course. This course they divided into twelve constellations; these are the twelve signs of the zodiac, which they termed *the twelve houses of the sun*; because he seemed to dwell a month in each of these signs.

The summer season begins when the sun enters Cancer; which happens the 21st or 22d of June. The sun is then at its greatest height above our horizon, and sends his rays almost perpendicularly upon us: and it is at this time that the heats of summer begin, which increase more and more in the following month, in proportion as the earth is heated by the scorching rays of the sun. Hence it is, that the month of July, and a part of August, are generally the hottest part of the year: and experience has proved, that the heat is at its greatest height from the 20th July to the 20th August. Now of all the stars with which the sun comes into conjunction, the dog-star is the most brilliant. Lost in the rays of the sun, it disappears from our eyes for a month, as is successively the case with all the stars which the sun meets with in its course: and the month of its disappearance is the time called the *dog-days*.

These observations would be of little importance, if they did not serve to combat a prejudice deeply rooted in the minds of many.

Dog-days.

An old tradition attributes the heat which is commonly felt in these times to the influence of the dog-star on the earth, on men, and on animals. This opinion is absurd from this circumstance only, that the occultation of the dog-star in the rays of the sun, does not always take place in that time which we call the *dog-days*. These days, properly speaking, do not begin till the end of August, and do not end till the 20th of September. And as the dog-star, or *Sirius*, always advances further, it will in time reach to October and November; and in the end to January: so that the most intense cold of the year will prevail in the *dog-days*.

When we reflect on this, we see it is impossible that this star should occasion those heats which are felt on the earth, and the consequences resulting from them. When, therefore, in the supposed dog-days, wine or beer spoils in bad cellars; when matters apt to ferment turn sour; when ponds dry up, and fountains cease to flow; when dogs, and other animals, and even men themselves, are attacked with madness; when we are seized with maladies, which an imprudent conduct during the heat brings upon us; this does not happen because a star is hidden behind the sun; it is the extreme heat of the air in that season, and our own imprudence, which are the alone causes of all these effects.

It is therefore high time to renounce a prejudice which does little honour to the human understanding. He that can persuade himself that certain figures which his imagination has placed in the sky, can have any influence on the earth, or on the health and reason of man, discovers a great want of judgment. It is not the stars, but ourselves, that we should accuse of the evils which we suffer. If, therefore, mortal maladies should prevail at this season, let us beware of attributing this to the influence of the dog-star, which is purely chimerical: let us rather believe, that they originate in our inadvertency and misconduct. To consider the subject seriously: we sin against a Wise Providence, by indulging such prejudices. Can we suppose, that the supremely good God, who governs the world, has created any thing in heaven or earth for the torment and misery of his creatures? Would not this be to believe in an inevitable fatality, which we cannot admit, while we acknowledge a Creator whose essence is wisdom and goodness? Instead of being guilty of such an error, let us glorify God, and secure our own tranquillity, by believing that we are under the protection of a most indulgent Parent; without whose permission not even one of our hairs can perish.

Sleep.

AUGUST IV.

SLEEP.

PEOPLE fall asleep with more or less rapidity, according to their constitution and state of health. But whether sleep come suddenly, or slowly, it always comes in the same way : and the preceding circumstances are the same in all men.

The *first* thing that happens when we begin to sleep, is the stupefaction of the senses, which, no longer receiving impression from external objects, relax and fall by degrees into a state of inactivity. Hence it follows, that the attention diminishes, and is at last lost ; the memory becomes disturbed, the passions become calm, and the connexion of thought and reasoning becomes deranged. As long as we *perceive* sleep, it is but the first step to it ; we are not sleeping, but dozing. To be properly asleep, we must have no longer that consciousness, that reflected idea of ourselves, which depends on the exercise of our memory. To the stupefaction of our senses is soon added a stiffness, and insurmountable resistance of the muscles. This is the *second* stage of sleep. This stage produces several symptoms in the machine, which may be observed in those who sleep in a chair. The eyelids wink, and open and shut of themselves, and at last sink down : the head totters, and falls forward ; we endeavour to erect it, but it falls lower still ; and at last we have no more strength to raise it up, the chin rests on the breast, and in this attitude sleep is quietly continued. While the head continues to totter from side to side, all the muscles are not as yet completely relaxed ; but, a little after, the relaxation becomes total, and the will has no power to prevent it. When sleep is profound, all the voluntary and animal functions are suspended ; but the natural and vital functions are then performed with more effect. This is the *third* change which sleep produces in us.

The preparation of humours by the chyle is better performed when we sleep. When we are awake, the natural motions are sometimes disturbed by those which are voluntary : and the motion of the fluids is accelerated in some vessels, and retarded in others. The blood is wasted, so to speak, in external actions ; and consequently it does not supply the internal parts in such abundance. The circulation of the blood is very strong in those parts of our bodies which are in motion ; and is continually pressing the humours in the secreting vessels, whilst, on the contrary, it is so weak in others, that the chyle can scarcely be changed into blood. A sweet sleep re-establishes the equilibrium every where : the vessels are equally opened ; the juices run uniformly ; the heat is preserved in a proper degree : in a word, nothing is dissipated ; all goes to the profit of the machine. Hence it is, that after a good sleep, we feel rested, refreshed, strong, and vigorous.

Sleep.

All these circumstances are well calculated to cause us to acknowledge the goodness of God towards us. What preparatives, what tender care, to procure us the blessing of sleep! What merits our attention and gratitude most is, that sleep is accompanied with a universal stupefaction of the senses, which comes upon us unawares, and which we cannot resist. The first of these circumstances renders sleep more sound and refreshing. The second makes it an inevitable necessity. What admirable wisdom of Providence appears in the relaxation of the muscles during sleep! The first which grows stiff is destined to defend one of the most precious of our organs; and one that is most exposed to danger, viz. the eye. As soon as we grow drowsy, the eyelid falls down of itself; covers and protects the eye till we awake. In other parts of our body the muscles contract with more force; because their being relaxed might be inconvenient, and even dangerous.

Let, therefore, the hour in which we are disposed to enjoy the sweets of sleep, be preceded with thanksgiving to our Heavenly Father. Let us bless him, not only because the days happily succeed each other; but because he has constituted us in such a manner, that sleep refreshes and recruits our strength. Let us lie down with these meditations; and let them be the first which shall present themselves to us when we awake.

AUGUST V.

THE DIVISIBILITY OF MATTER.

WE may easily be convinced of the infinite divisibility of bodies, by the different perfumes which plants and flowers exhale. How amazingly small must the odoriferous corpuscles of a carnation be, which diffuse themselves over a whole garden, and meet the sense of smelling every where! If this be not a satisfactory proof of this extreme divisibility, let us consider other objects which nature presents us; and, for instance, let us examine one of those silk threads, the work of a despicable worm. This thread, which is 360 feet in length, weighs only a grain. Consider again, into how many parts a length of 360 feet may be divided, without any of the parts becoming imperceptible. An inch can be divided into 600 equal parts, each of which will be as thick as a child's hair, and consequently may be easily seen by the naked eye. Therefore a grain weight of this silk may be divided into at least 2,592,000 equal parts; each of which may be seen without the assistance of a microscope. And as these same parts may be farther divided into many other millions of parts, a division which may be continued beyond the reach of thought; it is manifest that this progression may be continued *ad infinitum*. The last particles, which cannot be separated by human industry, must still have extension, and consequently be capable of division; although this cannot be realized in this world.

If we examine the animal kingdom, we shall have new proofs of the infinite divisibility of matter. A great naturalist put pepper into a glass of water, and by means of a microscope, discovered animalculæ a thousand million of times less than a grain of sand! How inconceivably small then, must the feet, the organs of sense, the muscles, veins, and nerves of such an animal be! What must their eggs and their young be! And how small must the members and vessels be, together with the juices which circulate in the veins of those young! Here imagination itself is lost, and all our ideas confounded; and yet nothing is more certain than what we have already mentioned.

What deserves our attention especially is, that the more the works of nature are magnified by our glasses, the more regular and beautiful they appear. But it is the reverse with the works of art: for when these are examined with a microscope, we are astonished to find them rough, coarse, and imperfect, though they have been executed with the greatest care, by the most eminent artists.

Thus, God has impressed an image of his own infinity on the smallest atom. The smallest body is a world in which millions of parts are found united, and arranged in the most perfect order. How astonishing is that wisdom which can operate in the little as well as the great with so much regularity and perfection! How great must that power be which could bring out of nothing that infinite number of bodies of all kinds! How rich must that Divine Goodness be which manifests itself in those minute bodies; seeing there is none of them which has not its perfection and use!

Considerations like these are very proper, to make us feel the limits of our own understanding. The least worm, the smallest insect, the least grain of dust, may convince us that there are many thousands of things of which we are ignorant, and which we cannot explain. Try, O man, to enumerate the parts of which the body of an animal is composed, which is a thousand million of times less than a grain of sand! Endeavour to ascertain how minute one of those rays of light must be, several millions of which may pass through an opening not larger than the eye of a needle! How speedily must thy ideas be confounded, and thou be obliged to acknowledge thy ignorance, and the limited state of thy understanding! How then canst thou be proud of thy knowledge, and have the presumption to find fault with the ways of the Lord, and speak against the arrangements he has made in nature! Canst thou imagine, that thou canst even know the millionth part of the beings which exist?—It is therefore our duty, yea more, our glory, to acknowledge our own ignorance, and the infinite grandeur of God.

Such is the use we should make of these meditations. Let us reflect on the infinite divisibility of bodies, only to feel more forcibly how great God is, and how *little* we are. This will give us room to admire the wisdom of the Creator: for by means of the infinite smallness of the particles of matter every void may be filled up with-

out the least interruption of motion ; and the universe presents us with a spectacle continually varied.

AUGUST VI.

THE EXTERNAL STRUCTURE OF INSECTS.

IN general we judge those animals only worth our notice which are distinguished from others by their bulk. The horse, the elephant, the bull, and such like creatures, appear in some sort to merit our attention ; while we disdain to cast a look on the innumerable hosts of small animals which people the air, the vegetables, and the dust. How many insects do we trample on ! how many caterpillars do we destroy ! how many flies buzz about us without inspiring us with the least curiosity ! And we only think of means to destroy them when they are a little troublesome to us. Nothing can be more unreasonable than such inattention ; for, it is certain that the power and wisdom of our Creator are not less manifested in the structure of a snail, than in that of an elephant, a horse, or a lion.

The bodies of the greater part of insects are composed of many rings, which close on each other ; and are employed in all the motions of the animal. The essential character which distinguishes insects from all other animals is that, properly speaking, they have no bones. Much wisdom is evident in this part of their formation. The motions which are adapted to all insects ; the manner in which they are obliged to seek their nourishment ; and especially the metamorphoses which they undergo ; could not be performed with so much ease, if, instead of those moveable rings, (which recede from, and approach to each other at the will of the animal) their bodies were connected and strengthened by bones.

It is observable in several insects, that they have the power of contracting or enlarging their heads at pleasure ; that they can lengthen or shorten them ; hide, or cause them to appear, as their necessities may require. There are others, whose heads always retain the same form. The mouths of insects are generally provided with a sort of teeth, or with a trunk. This disposition of the head is necessary, not only because of the aliments on which they feed, but also because of the persecutions to which they are exposed.

Many kinds of insects are without sight ; but they are compensated for this by *feeling*, or some other sense. Insects have two sorts of eyes ; those which are smooth and bright are generally few in number : but the eyes which resemble net-work or shagreen, the cornea of which is cut in angles, are extremely numerous. There are sometimes thousands of them. None of these is moveable ; but their number and position supply this defect. The antennæ or horns, with which the greater part of insects are provided, are of great service to them in their manner of life. These horns being

extended before the body in its march, and feeling out the way, not only inform the animal of the dangers which threaten it; but also enable it to discern the aliments which are best suited to its nature.

The legs of insects are either scaly, or membranous. The former move by means of several joints; and the others, which are more soft, move in all directions. Often the same animal has both kinds of legs. There are insects which have several hundreds of feet; but these do not travel so fast as those which have only four. In respect to this part of the body there is an infinite variety among insects. With what art must the legs of those insects be constructed, which fasten on smooth and polished surfaces! How elastic must the legs of those be which leap! How strong those which dig in the ground!

Two or four wings are placed in the middle of their bodies. Some of these are as transparent as the finest gauze: others are full of mealy scales. Some are without covering; others are hidden in cases or sheaths. At the sides, or at the extremity of the body, there are little orifices in the form of eyelids, which are termed *stigmata*, or prints; these are the organs of respiration.

The variety observable in the form and constitution of the limbs of insects, is prodigious: and the lives of many men would not suffice to describe the different figures of these little animals. How varied are the forms of those little insects which walk, fly, leap, and creep! Nevertheless, however diversified their forms may be, we may observe in them the same perfect harmony and proportion. Would it not be the height of extravagance or perverseness, not to acknowledge, in all this, the infinite wisdom of the Creator? A man is no further either virtuous or rational, than he acknowledges and adores God in all things. Let us acquit ourselves henceforth in those duties: as often as we see an insect, let us study, as much as possible, its wonderful construction, that we may have a more lively sense of the greatness of the Most High.

AUGUST VII.

COMPARISON BETWEEN THE SENSES OF MEN AND THOSE OF ANIMALS.

HAVE some animals more perfect senses than man? We can only answer in the affirmative in some particular cases: for in this respect also, we must say of man, that he is more highly favoured than all other animals. It is indeed asserted, that *spiders* have a finer feeling; that the *vulture*, the *bee*, and the *dog*, have a keener smell. We know that by means of this, the hound follows the track of the game: and that other dogs are taught to find *truffle* under ground. The *swine* also, guided by his smell, digs with his muzzle for his food. *Stags* are supposed to have so quick a hearing, that they can discern the sound of bells at the distance of several miles: and that the *mole*

Comparison between the senses of men and those of animals.

hears better, under the earth, than man, who inhabits the surface, and lives in the open air.

In regard to sight, the *eagle*, among birds, and the *lynx*, among quadrupeds, are said far to exceed man. These observations are certainly true ; but if we consider animals in general, and compare them with man, we are struck with the great prerogative given to him above all the brute creation. Man is naturally endowed with *five* senses : and this advantage is not common to one half of the animals. The *zoophytes*, which form the connecting link between the animal and vegetable kingdom, have only the sense of feeling. Many animals have only two senses ; some three ; and those which have five, are considered the most perfect class. But even the most perfect animals have not senses more perfect than ours. There are certain senses among men which are astonishingly exquisite : some Indians can judge by their smell how much alloy is mixed with the precious metals as well as we can by the *touchstone*. The inhabitants of the *Antilles* can discern, by their smell, whether a Frenchman or a Black has last passed along the road.

The perfection of the senses, in some savages, supplies the lack of intellect. Many people have exercised and improved certain senses to an astonishing degree. If man, like the animals, had no help but his senses to procure food, and to preserve himself from danger ; if reason were not a more sure and suitable guide to him ; his senses, without doubt, would have acquired the highest degree of refinement by exercise. But, in reality, man does not require senses more exquisite than those which he possesses. Reason compensates him more than a hundred fold for the privileges which certain animals appear to have over him. Besides, we may confidently assert, that if our senses were more exquisite, many inconveniencies would result from it. Let us take, for instance, the sense of hearing ; were this in us as quick as the safety of some animals requires it should be in them, the most distant noise, and the confused din of a mixture of sounds, would continually interrupt our meditations and repose, and disturb our noblest occupations.

Thanks to the infinite wisdom of the Creator, who has so measured the degree of our sensations, that they are sufficient to enable us fully to enjoy the blessings of nature, without disturbing the noble occupations of human reason. The limited state of our senses is a gain rather than a loss to us ; a perfection, rather than an imperfection. Happy he who allows his reason to govern his senses ; and who enjoys all the advantages which must result from a perfect harmony between them !

The thunder.

AUGUST VIII.

THE THUNDER.

THE thunder roars ! O mortal, who is it that causes this terrible noise ? Who is it that darts the lightning from the clouds ? Behold, O sinner, it is the Lord of the universe ; it is the arm of the Most High which hurls the thunderbolt.

Nature reposes in his hand ; he preserves and blesses it ; but he shall speak, and at his word, the heavens and the earth shall be consumed by the flames : the heavens and the earth shall be no more !

The thunder roars ; how dreadful is the stormy sky ! the lightning flashes ! The thunderbolt is shot ! O God, how great art thou, and how terrible thy power.

The Lord, from the height of his throne, frowns upon us ; and by the glare of the lightning, we see the grave open under our feet.

When the Lord sits upon the clouds, men and heroes tremble ; when he sharpens the sword of his anger, the universe turns pale.

God thunders ; the sinner hears, and shudders ; scarcely dare he lift his eyes towards him, whose voice seems to threaten him with destruction.

O Christian ! The majesty of thy God can bring no terror into *thy* soul ; even when he sits on the stormy clouds, and darts forth his lightnings.

When the loud sound of the thunder astonishes the wicked, and fills him with terror, *thy* God watches over *thee*, and shields thee from the lightning.

And, though he should even take away thy life, all his judgments are right ; he is thy Master, and thou shouldest say unto him, Lord, my soul quietly submits : whether I live or die, all my hope is in thee.

The Sovereign of the thunder is the Friend of the Christian. What, though he should take me away suddenly from the land of the living, I know that his thoughts towards me are thoughts of grace ; and he will cause me to draw salvation from the fountains of eternal happiness.

He who, when the sky is serene, glorifies his God, may be calm and peaceable when the sinner flies at the sight of the dark clouds.

But, where can the sinner fly ! Can he escape from the sight of the supreme God ! In vain does he attempt to hide himself ; the lightning pursues, and smites him in his dark retreat.

Fly not, therefore, O sinner ! Renounce thy illusion ; thou canst not hide thyself from the face of thy Creator, who follows thee every where ; and whose hand is every moment upon thee.

The thunder.

When the thunder roars, thou tremblest and smitest thy breast : but when the tempest ceases, thou returnest anew to thy sinful pleasures.

Sinner, if thou wouldst obtain mercy, thank the Lord for his long-suffering towards thee : and forget not the promises thou didst make in the time of thy distress : think of this, and know that God will not be mocked.

God is merciful : he spares the rebellious : but he will not spare for ever. Jehovah is just : and the Judge Supreme shall cite the criminal to his bar. What is the thunder that roars over our heads, in comparison of that solemn day in which we shall hear the whizzing sound of the tempest ? The elements themselves shall be dissolved by the same fire ; and the earth, and all it contains, be burnt up !—

AUGUST VIII.*

THE HAMSTER.

THE *hamster* belongs to the *mus* genus, and bears the nearest resemblance to that of the *myoxus*, or *marmot*. It agrees, however, with both in the construction of its habitation, its way of life, and its general properties. In *Gmelin's New System of Nature*, the hamsters make the third general division called *criceti* : and the animal which is the subject of this paper, is styled the *mus cricetus Germanicus*, or German hamster. The males are about *ten* inches long, and the tail about *three* : but the females are scarcely more than one half of this size. The former weigh from 12 to 16 ounces each. Usually the head and back are of a reddish brown colour, the cheeks red, the sides paler, with three white spots ; the breast, upper part of the fore-legs, and belly, are black. But the colour varies much : sometimes they are found entirely white, or yellow ; and there is a species which is almost entirely black. But what is most worthy of our observation in this animal are, its *feet*, its *teeth*, and its *cheek-pouches*.

The hamster uses its feet to run, dig, and climb with. They are short and strong, having four toes, and a claw instead of a fifth toe, on the fore-feet ; and five toes on each hind-foot. Its teeth are *sixteen* in number : it has two incisors in each jaw ; and three grinders on each side. The grinders serve only to chew with ; but the fore-teeth, or incisors, serve not only to shell the corn, but also for weapons for its defence ; and to dig up the earth, where it is too hard for its claws alone.

The *cheek-pouches* are two skinny bags, proceeding from the jaw, above the neck and shoulders, and afterward sloping a little towards the spine. They lie enclosed between the muscles and the outward skin. On the outside, these pouches are membranous, smooth, and shining : and in the inside, there are a great many glands which

The hamster.

secrete a fluid, which serves to keep the parts flexible, and to resist any accidents which might be occasioned by the roughness of particular seeds. The hamster uses these pouches to collect and carry home the corn: and they are so large as to contain an ounce and a half of corn at once: which, on his return to his den, the animal empties by stroking and squeezing them with his fore-feet, beginning behind, and pressing forwards towards the mouth. When a hamster is met with his cheek-pouches full of corn, he may be easily taken with the hand, without the risk of being bitten; for, while his pouches are full, he has not the free use of his jaws: but if he be allowed a little time, he soon empties his pouches, as related above, and raising himself on his hind-legs, stands boldly on his defence, or darts on his enemy.

This animal lives always in the corn-fields. Here it forms itself a subterraneous burrow, divided into several apartments, with two holes leading from the surface: one is perpendicular, at which it goes in, and comes out: and the other, where it lodges its excrements, is oblique, that the wet may the more readily run off. One part of this subterraneous dwelling, divided into several apartments, is the *store-house*, where it lays up its winter provisions of corn, beans, peas, vetches, linseed, &c. but each species of grain is kept by itself, in a separate cell. The chambers, where themselves and young lodge, are lined with straw or grass. The old ones dig their chambers several feet deep; but those of the young, scarcely ever exceed one foot in depth. In these holes the animal dwells alone, for it has a rooted enmity against all other creatures, and even against those of its own species, the females not excepted. When two hamsters encounter, one of them certainly falls; and the weaker is devoured by the conqueror.

The hamster lies by day in his den, still and quiet: and in the dusk of the evening he comes out, and runs about till midnight: he then retires again into his hole, and continues quiet till about an hour before daybreak; then he comes out once more, and runs about till sunrise.

The hamster's manner of living is considerably diversified: like various other animals, he becomes torpid in winter, and continues in that state the greater part of the cold season. The male awakes about the middle of *February*, and the female in *March*. They do not leave their holes immediately on their recovery from this torpid state, but continue quiet till they have consumed the remains of their provisions, which amounts often to one-third of the whole: then, the former opening his hole in *March*, the latter in *April*, they come out, return to their former manner of life, and go about seeking herbs.

It cannot be denied that the hamster is a very destructive creature. Some years they are so numerous as to occasion a dearth by their immense consumption of corn. In one year 11,000 skins, in a second 54,000, and in a third 80,000, were brought to the Town-house of *Gotha*, to receive a reward for their destruction. The

The hamster.

hamster lives a considerable time, and multiplies prodigiously. The female brings forth twice or thrice in the year, and her litter is never fewer than *six* : but oftener from 16 to 18. The growth of the young is very rapid : at fifteen days old they begin to dig the earth ; and in about three weeks they are capable of subsisting independently of the dam.

The hamster is preyed on by several animals ; but the *ferret* seems ordained to be its most inveterate enemy. It is not so strong as the hamster, but it is much more active and cunning ; and by these means it prevails over him. In summer and autumn he is the ferret's food. He pursues him even into his den, and kills him there : having thus gained the victory, he makes it his own habitation. From this he goes out a hamster-hunting, and having found, he seizes him so strongly, that he drags him away and preys upon him.

Even this circumstance shows the wisdom of the Divine Providence. This animal is in hostility with all others, and yet the species is preserved ! Every creature is an object of the care of Divine Providence, because necessary to the perfection of the whole. The hamster may be objected to, because destructive ; but were there not such creatures, God would not cause the earth to bring forth so plentifully. For these he makes a provision in our fields, and they can consume no more than he has provided for them. At times they may become a scourge ; but when we balance our gains with our losses, we shall find, on the most scrupulous reckoning, that we have sustained no damage : so that instead of blaming the Divine government, we shall have much reason to adore it. After all, what are the few pounds of corn which the hamster carries away from our fields, in comparison of the thousands of bushels which we collect there !

AUGUST VIII.*

SUPERSTITIOUS OPINIONS RELATIVE TO THE DESIGN OF THE ANIMAL KINGDOM.

IT is astonishing that persons should be still found, over whose minds superstition has so much influence, as to represent the most excellent and beneficent of beings as a tyrant ; and the gracious works of his hands as so many scourges to mankind. Yet examples of this kind have not been wanting in all ages, and even the present enlightened one is not a little disgraced by them.

When *mice*, for instance, become very numerous in *Norway*, the inhabitants keep what they call a *mouse-feast*, which consists in putting on their best apparel ; and instead of engaging in any kind of work, they lie down and sleep ! Again, when that species of insect called the *grub-dragon*, crawls about, the people spread their garments in the way, and look upon it as a happy omen if this army of

grubs, which defile every thing by a glutinous matter which transpires from their bodies, should crawl over them. But should this crawling legion go round them, and leave the clothes untouched, it is considered as a very bad omen indeed.

When the well-known insect, the *sphynx atropos*, called *death's head*, from its having the exact resemblance of a *human skull* on its thorax, is seen flying about in great numbers in the evening, it is considered, in certain places where dark superstition still reigns, as foreboding a great mortality both among men and cattle.

What a series of misfortunes has been predicted from the *gall-nut*, which grows upon the leaves of the *oak*; in which is always found a creature in the form of a *grub*, a *spider*, or a *fly*. Each of these insects has been made the prophet of some particular disaster. The *grub* proclaims *famine*; the *spider*, *contagious disorders*; and the *fly*, *war*! Although these apparently different animals are but the same insect under different forms!

That ticking sound in walls, about beds, old furniture, &c. which, from its resemblance to the sound of a *watch*, is called the *death-watch*, is considered among the vulgar a certain forerunner of death.

When we examine this ominous business more closely, we find the noise to proceed from the female of that insect called the *ptinus pulsator*, which usually, in the night-time, gives 7, 9, or 11 distinct strokes, with its head against the side of the hole in which it lodges, in order to attract the *male*!

In a fine summer morning, when walking out, we often perceive something resembling a *black powder* strewed upon the ground, on which, if we attempt to tread, it appears to dance and skip about in all directions. The vulgar in certain places consider this *black dust* as no less than the effect of *witchcraft*; and whenever they perceive it, run with all speed out of the way, and take the most circuitous route, rather than attempt to pass through it, lest they should fall under the power of sorcery. But what is it that thus terrifies us and causes them to run? Only that kind of insect adhering sometimes to plants, commonly called the *earth-flea*.

These examples, the number of which might be greatly multiplied, are considered by superstitious people as means intended for their conversion.—But it is to be hoped that the above considerations will at least show them, that they have been long and often mistaken in their interpretation of natural things; and have become their own tormentors by the false opinions which they have formed concerning them. The means of salvation, and the warnings to prepare for death, are sufficiently furnished by the unerring word of truth:—and the whole of the moral government of the world is continually regulated and ordered by a wise Providence that can never be mistaken; and in no case ever left to the fortuitous circumstance of a fly depositing its egg upon an oak leaf, or to the casual noise made by an insect in decayed wood.

From such circumstances as these we may see the necessity of enlarging our knowledge of nature, and of meditating more on the wisdom and goodness of the Creator. The more these are considered, the more we shall be convinced that God has made all things for the manifestation of his perfections, and the comfort and happiness of man : and that all his works, both in heaven and in earth, though, in some cases, they may at first view appear evil to us ; are, nevertheless, perfect and good in their respective kinds beyond the possibility of amendment.

AUGUST IX.

CONTEMPLATIONS ON A MEADOW.

YE gloomy and majestic woods, where the fir-tree rears its stately head ; where the tufted oaks spread their foliage ; and ye rivers, which roll your silver streams among the gray mountains ; it is not you which I mean this day to admire : but the verdant enamel of the meadows shall be the subject of my meditations.

What beauties present themselves to my view : and how diversified are they ! Thousands of vegetables, and millions of living creatures ! Some flutter from flower to flower ; while others creep and crawl through the dark labyrinths of the tufted grass : infinitely varied in their form and beauty ; all these insects find here both food and happiness. All inhabit this earth as we do ; and how despicable soever they may appear, each is perfect in its kind.

How soft the murmur of the limpid stream which flows through the *watercress*, the *trefoil*, and the *clover*, whose purple or blue flowers are agitated by the motion of its little waves. Both its banks are covered with thick grass, interspersed with flowers, which, bending over the brink, trace their image in the water.

I now stoop down, and look across that forest of waving herbs ; what a mild light the sun pours on the different shades of green ! Delicate plants interweave themselves with the grass, and thus mingle their tender foliage ; or else they rear their stately heads above those of their companions ; and display the flowers which have no perfume : while the humble *violet* grows upon the dry banks, and diffuses the sweetest exhalations around. Thus, we see the useful and virtuous man in poverty ; while the great and the rich, clothed in superb attire, consume in idleness the blessings of the earth.

Winged insects pursue each other through the grass : sometimes I lose sight of them in the verdure ; and sometimes I see a swarm dart up into the air, and sport in the rays of the sun.

What is that variegated flower which waves near the brook ? How lively and beautiful are its colours ! I draw near and smile at my mistake, a *butterfly* leaps off, and leaves the blade of grass on which it perched, and which bent under its weight. In another place, I per-

ceive an insect covered with a black cuirass, and adorned with brilliant wings ; it comes buzzing to perch on a bluebell, probably, by the side of its companion.

What other buzzing is that I hear ? Why do those flowers bend their heads so ? It is a swarm of young bees. They have lately flown from their distant home to disperse themselves over the gardens and meadows. Now they collect the sweet nectar of the flowers, which they will by and by convey to their cells. Among them an idle citizen is not to be found. They fly from flower to flower, seeking their booty, and hide their velvet heads in the calix of flowers ; or pierce, with labour, through those which are not yet opened.

There, on a high stalk of clover, a butterfly is perched : it shakes its variegated wings, and adjusts those brilliant feathers which compose its crest, and seems proud of its charms. Beautiful butterfly ! make the flower bend which serves thee for a throne, and contemplate thy rich dress in the mirror of the waves. Thou wilt then resemble a young beauty, admiring herself in the glass which reflects her charms. *Her* garments are less beautiful than thy wings ; but she is as giddy and thoughtless as thou art.

See this little worm running on the green turf ; all the researches of luxury, all the art of man, cannot imitate the green sprinkled gold, which covers its wings, where all the colours of the rainbow sport.

“ O how beautiful is nature ! Grass and flowers grow in abundance, the trees are covered with leaves : the gentle breeze salutes us ; the herds find pasture ; the tender lambs bleat, skip about, and rejoice in their existence.

“ Thousands of green blades rise up in this meadow ; on each point hangs a drop of dew. How many primroses are here assembled ! How do their leaves tremble ! What harmony in the note of the nightingale from yonder hill ! Every thing expresses joy. Every thing inspires it. It reigns in the valleys, and on the hills, on the trees, and in the thickets ! O how beautiful is nature !”

Yes, nature is beautiful, even in its smallest productions. He who feels no delight at the sight of its charms, because he is a prey to tumultuous passions, pursues false blessings, and deprives himself of the purest pleasures. Happy he, whose innocent life glides away in the contemplation of the beauties of nature. The whole creation smiles upon him. Joy accompanies him whithersoever he goes, and under whatever shade he rests. Pleasure springs up for him in every fountain, exhales from every flower, and resounds from every grove. Happy he, who is delighted with those innocent joys ! His mind is serene as the calm summer day. His affections are as gentle and pure as the perfume which the flowers diffuse around him. Happy he, who, in the beauties of nature, traces out the Creator ; and consecrates himself wholly to his God !

AUGUST X.

MISCHIEF OCCASIONED BY ANIMALS.

IT is distressing to see so many productions of nature, and often these the most beautiful, exposed to the ravages of animals. Every summer, we may see much damage, especially in the vegetable kingdom, occasioned by the rapacity of different kinds of birds, insects, &c. How many trees are destroyed, and fruits consumed, by worms, May-bugs, and caterpillars ! Of how many things necessary to our subsistence, are we deprived by the insatiate sparrow, and the no less voracious raven ? How afflicting to see a whole field destroyed by rats or locusts !—These, and similar complaints, are often made : and people fancy that certain animals exist only to torment mankind. There is *some* foundation for these complaints ; and experience proves, that there are animals which are injurious to men as well as to plants. It is more easy to exterminate wolves, lions, and other ferocious beasts, than to destroy insects, when their numerous troops cover a country. In *Peru*, a species of ant, called *chako*, is a terrible scourge to the inhabitants : even their lives would be in danger, if they did not use precautions to deliver themselves from these formidable insects. The devastations made on fruit-trees by caterpillars, and in fields by mice, is well known.

But, however real these inconveniencies may be, they do not authorize such bitter complaints as those we make :—complaints in which self-love has too great a part. We are pleased to see that the creatures which injure us, destroy each other ; and we think we may, without injustice, take away the lives of such animals, whether for food, or for any other purpose : but, we cannot bear that they should take any thing away from us : we expect that they should contribute to our subsistence : and yet we will allow them nothing ! In reality, have we any more right over the life of a gnat, than it has to a drop of our blood ? Besides, in complaining of the voracity of animals, we do not consider that this arrangement of nature is not so disadvantageous as it appears. To be convinced of this, let us consider the animal kingdom collectively. Such a species as appears noxious, is, notwithstanding, of real use ; and it would be dangerous to endeavour to destroy it. Several years ago, some inhabitants of the *then* English colonies in America, endeavoured to extirpate the whole race of *jays*, because they imagined that these birds did much injury to the corn. But, in proportion as the number of jays decreased, people were astonished at the enormous ravages which a prodigious multitude of worms, caterpillars, and especially May-bugs, made in the fields. Speedily the persecution of the jays ceased ; and, as they multiplied, they put an end to the plague which was the consequence of their destruction.

Some time ago, a project was formed in Sweden to destroy the crows : but it was observed, that these birds are not only fond of

 Mischief occasioned by animals.

seeds and plants, but that they destroy those worms and caterpillars which consume the leaves, and cut the roots of vegetables.

In North America, the sparrow was persecuted with the utmost fury ; and the consequence was, that the gnat multiplied so much in the marshy countries, that they were obliged to leave whole tracts uncultivated.

Pheasant-hunting is so considerable in the isle of *Procida*, that it caused the king of Naples to prohibit the use of *cats* to the inhabitants. At the end of a few years, it was found that the rats and mice multiplied to such a degree as to occasion great mischief : so his Neapolitan Majesty was obliged to revoke the decree that prohibited the use of cats.

And why should we be so selfish, as to envy those creatures that small portion of our provisions which is necessary for their subsistence : can we consume all the productions of nature ? Have we any deficiency of the things necessary for our comfort and support, on the account that the birds, mice, and insects, assist us to consume the blessings which God has granted to us in such abundance ; and of which a part would be spoiled, if these creatures did not feed upon it ? Instead of abandoning ourselves to unjust complaints, let us rather in this acknowledge the wisdom of our Creator. All is connected in the vast empire of nature : no creature in it is useless ; none is formed without design ; although the use of several may be unknown to us. Their existence itself is sufficient to convince us that they were created for the wisest purposes. Thus, the sight of the apparent destructions and disorders in nature should make us look up to God, who has created nothing in vain ; and who preserves nothing without reason ; and if he permit any thing to be destroyed, it is not without a wise design. Were we deeply convinced of these truths, all the works of God would excite us to glorify and bless him.

 AUGUST XI.

VARIETY OF COLOURS.

WHEN we consider how dull and gloomy the gardens and fields would be, and how confused all objects must appear, were there only one colour ; we must acknowledge the wisdom and goodness of God, who, by making such a variety of tints, has designed to multiply and diversify our pleasures on earth. Had he not designed to place us in an agreeable habitation, why should he have adorned all its parts with such diversified and beautiful paintings ? The sky, and all those objects which are seen at a *distance*, are painted at full length. Splendour and magnificence are their characteristics. But lightness, delicacy, and graces of miniature, are found in all those objects designed to be seen *near* ; such as foliage, birds, flowers, insects, &c.

Variety of colours.

But whence is this distinction of colours ? Each ray of light appears to be simple ; but by refraction it is divided into several : and hence arise different hues. A glass filled with water, and exposed to the sun, reflects certain colours upon white paper. But angular glasses, called *prisms*, well cut and polished, reflect more vivid colours. We may imitate the finest rainbow, and bring it close to us, if we hold a prism opposite the sun ; or if, through a small hole in a window of a close shut chamber, we receive a ray of light on a prism. According as the refraction of the ray is more or less strong, the colours will be more or less bright. The most refrangible ray is the *violet*, and consequently it is the weakest. After this comes the *indigo*, then the *blue*, next the *green*, then the *yellow*, next the *orange*, and lastly the *red* ; which, of all the rays of light, has the least refrangibility.

The nature of coloured bodies contributes to the variety of colours. The smallest particles of all bodies are transparent. Hence it is that they break, absorb, or reflect the rays sometimes in one way, and sometimes in another, after the manner of prisms. Besides, what proves that colours are not inherent in bodies is, that the neck and feathers of a pigeon, or peacock, and even changing stuffs, such as taffetas, and other silk stuffs, change colour according to their different positions. This may enable us to understand whence the diversity of colours proceeds. The whole may be reduced to this ; the surfaces of all bodies are composed of extremely thin laminæ, which, according to their thickness, reflect certain coloured rays, while they admit or absorb others in their pores. Thus, when a body, whose surface is smooth, reflects, and throws back almost all the rays of light, it appears *white* ; and when, on the contrary, it absorbs them, it is *black*.

Let us here admire the wisdom and goodness of God ; if the rays were not divisible, and if they were not differently coloured, all would be uniform : and we could distinguish objects only by reasoning, and by the circumstances of time or place. But how tedious and perplexing would it be, to be obliged, on all occasions, to have recourse to reasoning, in order to distinguish one thing from another ? The whole of our life must then be employed rather in studying than in acting ; and we should be for ever in a state of uncertainty. Were there only one colour on the earth, our eyes would soon be fatigued with it ; and this constant uniformity would cause us more disgust than pleasure. But the different colours which God has produced serve to diffuse more beauty over the earth ; and to afford pleasures ever new to our eyes. This is a fresh proof that God is always employed, not only to provide for our necessities, but also for our gratification ; and that, in the formation of the world, he has studied not only the essential perfection of his works, but also to give them all those ornaments which might enhance their value. In the mixture and different shades of colours, utility and beauty are ever connected. As far as our sight can reach, we always discover new charms in the

Variety of colours.

fields, valleys, and mountains. All minister to our pleasures, and all should excite our gratitude to God.

AUGUST XII.

THE BUILDINGS OF THE BEAVER.

IF a man who had never heard of the industry of *beavers*, and their manner of building their houses, were shown some of their edifices, he would doubtless suppose them to be the work of several eminent architects. Every thing is wonderful in the labours of those amphibious animals. The regularity of the plan, the size, solidity, and admirable contrivance of the buildings, must fill every attentive observer with astonishment. The beavers choose a place to build on where they can have plenty of food; and a river out of which they may form a lake to bathe in. They begin, first, by constructing a dike, or bank, which keeps the water level with the first floor of the building. This dike, or bank, is sometimes a prodigious work, from six to twelve feet thick at the foundation: it is made sloping, and diminishes insensibly till it is about two feet in breadth at the top. The materials of this dike are wood and clay. The beavers cut pieces of wood as thick as a man's arm, with astonishing facility. They fix one end of these in the earth very near to each other, and interweave them with other pieces, smaller and more pliant. But as the water may run through, and leave their watering place dry, they have recourse to clay, which they well know where to find, and with which they fill up all interstices, both within and without: so that the water cannot possibly pass through. In proportion as the water rises, they continue to raise their dike.

Having finished their dike, they begin to work at their houses; which are round or oval buildings, divided into three stories, raised one above another. One of them is below the foundation of the dike, and generally full of water, the two others are above. They fix these little buildings in a very solid manner on the brink of their pond, and always by stories; that if the water should rise, they may be able to lodge higher up. If they find a little island near their pond, they build their houses on it, which is then more solid; and they are less incommoded with water, in which they cannot remain long at a time. If they do not find this convenience, with the assistance of their teeth they bury stakes in the earth, in order to support their building against the winds and the water. At the bottom they make two doors, to go out into the water: one leads to their building-place, the other to the passage which leads to the place where they deposite every thing that might defile their upper apartments. They have a third door at the top, for fear of being taken

Buildings of the beaver.

when the ice blocks up the lower doors. Sometimes, they build their houses entirely on dry ground; and make ditches from five to six feet deep, to go down into the water. They use the same materials, and the same industry for their buildings as for their dikes: the walls are perpendicular, and are about two feet in thickness. They cut off, with their teeth, the ends of the sticks which project from the wall: then mixing clay with dry grass, they make a composition, with which they plaster the inside and outside of their building: in this work their tail serves instead of a trowel. The inside of the house is arched; and the size of it is regulated by the number of the inhabitants. Twelve feet long, by eight or ten broad, is a space sufficient for eight or ten beavers. If the number be greater, the building is enlarged in proportion.

The instruments which the beavers make use of, are four strong and sharp teeth, the two fore feet, the toes of which are separated; the two hind feet, the toes of which are connected with membranes; and their tail, which is covered with scales, and resembles an oblong trowel. With these few simple tools they outdo our masons and carpenters, with all their apparatus of trowels, squares, axes, saws, &c. With their teeth they cut the wood, with which they construct their buildings; and that which they provide for their food. They use their fore-feet to dig the ground, and to soften and knead the clay. Their tail serves in place of a hod, to carry the mortar, or clay, and afterward as a trowel to lay on and smooth the plaster.

The works of beavers have the nearest resemblance to those of men: and if we were to judge by the first impression they make on us, we should imagine them to be the produce of reason and reflection. But, if we examine them more closely, we shall find that in all their architecture, these animals act not by reflection, but according to innate instinct. If they were directed by reflection, they would build differently now from what they did formerly, and would continually improve. But we see that they continually follow the method of their ancestors; and never go out of the circle which nature has prescribed to them. Thus, the beavers of this present time build exactly in the same way that those did who lived before the deluge.

But this should not prevent our admiration; as, of all the animals which live in a social state, they come the nearest to the human race. We have only to see them, to be convinced that beasts are not simple machines; and that a spiritual principle directs all their motions and actions. But what an infinite difference has God put between the faculties of animals! How vastly superior is the instinct of the beaver to that of the sheep! And what Divine wisdom is manifested in the gradations by which brutes insensibly approach to the human species! May we profit by the discoveries we make of the different faculties of animals; and use them to improve ourselves more in the knowledge and love of the Creator of all beings!

The manner in which the human body is nourished.

AUGUST XIII.

THE MANNER IN WHICH THE NUTRITION OF THE HUMAN BODY IS
EFFECTED.

OUR aliments are composed of two parts : that which is properly nutritive, and should continue in the body ; and that which is not nutritive and should be expelled from it. In respect to both, it is necessary that the food we eat should be well ground, and its parts separated. This is begun in the mouth, by mastication, or chewing. The *dentes incisores*, or fore teeth, cut and separate the pieces ; the *dentes canini*, or side teeth, tear it ; and the *dentes molares*, or double teeth, grind it small. The tongue and lips contribute also to this, by keeping the food under the teeth as long as it is necessary. Certain glands being compressed in the act of chewing, throw out the *saliva*, which moistens the food, penetrates, and renders it easy to separate its parts, and contributes to the digestion. Hence the great necessity of properly chewing the food before it is taken into the stomach.

The aliments thus ground small, moistened, mixed, and partly elaborated, are taken into the *pharynx*, and pass through a canal, where there are glands which continually furnish a certain liquor which lubricates it, and renders the passage of the food more easy. If this happen to be too dry, the sensation of thirst tells us that we should drink. The food follows thus the course of the *œsophagus*, till it descends into the stomach. This is provided with a glutinous liquor, and another juice still more active ; both of which bear the name of the *gastric juice*. These serve to ferment and concoct the aliments. When the stomach has been too long empty, this gastric juice irritates its nervous coats, and produces that sensation which we term hunger. The stomach is always in motion by the contraction of its fibres up and down, so that its cavity is strengthened, and the two extremities drawn towards the centre, so that the whole is equally contracted : the aliments then easily finding the passage through the *pylorus*, descend through it into the intestines. It might be supposed, from the contraction of the stomach mentioned above, that they would be as liable to return through the *œsophagus*, as to descend through the *pylorus* ; but this is prevented by a valve which closes the passage of the former.

The intestinal canal is properly a continuation of the stomach. In this canal there is a constant motion, called the *peristaltic motion* ; by which the whole alimentary mass is agitated above, below, and on all sides. The aliments, by the preceding operations, are reduced to a kind of soft paste, which continues long enough in the intestines, and advances slowly by means of their vermicular motion. This paste is afterward mixed with the *bile*, which is separated by the liver, and serves to secrete the *chyle*, and dissolve the aliments. In all the intestines, the orifices of certain extremely fine vessels are discovered, which

The manner in which the human body is nourished.

are termed the *lacteals*. The whitest and purest part of the alimentary mass passes through these vessels, which pour it into one much larger ; by which it ascends above the breast and is thrown into the veins. It then loses its white colour, and by its mixture with the blood and other juices, becomes *red*. The nutritious juice prepared and perfected thus in the veins and glands, is conducted, by a multitude of canals, into the different parts, where it is necessary for the nutrition and preservation of the body. As to the gross and innutritious part, which is found in the large intestines, it passes from the *cæcum* into the *rectum*, and accumulates in this latter intestine, till, at a proper time, it is expelled by the action of the organs.

Behold what a variety of operations are requisite to accomplish one of the necessities of the body ! How many parts and organs must concur and labour, in order to provide the necessary nourishment and growth for the whole ; it is by the intimate relation and connexion which subsists between the external parts of our bodies, that the digestion of the food, and secretion of so many different juices, must be effected. What is most admirable is, that all the parts of our bodies which are thus exercised to effect its nutrition, serve also for other purposes. The *tongue*, for instance, contributes to mastication : but it is also the organ of speech and taste. In a word, there is not one member of our bodies which has only one office. And this is certainly a striking proof of the infinite wisdom of the Creator. Let us think of these things at our meals ; and endeavour to make them, in some sort, the subject of our conversation. This will afford us a rich fund of useful matter ; and by acting thus, we shall follow the sage advice of the apostle, *Whether ye eat or drink, or whatsoever ye do, do all to the glory of God.*

AUGUST XIV.

NATURE CONSIDERED IN DIFFERENT POINTS OF VIEW.

THE works of nature, so superior to those of art, are particularly so in this, that their admirable *variety* always furnishes new subjects of astonishment and pleasure. We look once or twice at a work of art, and suppose we do return to it oftener, we at last grow tired, and either look no more at it, or see it with a certain degree of indifference. But, when we attentively examine and reflect on the works of nature, our mind is never fatigued : we ever find new charms in them, and could continue the contemplation for ever.

If we consider nature in its most *majestic* and *sublime* point of view, with what astonishment are we struck in viewing the immensity of the heavens, the innumerable multitude of the stars, and the immense extent of the sea ! Compared with these, all the works of art, however great and excellent they may be, are insignificant, and of no

Nature considered in different points of view.

value. All that God has made, and all he does, is stamped with a grandeur which surpasses all our ideas and conceptions. To give us an idea of his infinity, he had only to form the sky. This shows the magnificence and grandeur of the Creator better than all the earth contains. Is there any thing more proper to inspire us with profound veneration for God, than to contemplate him in these immense works? With what ecstasy and religious fear should we feel ourselves penetrated, when we view those great phenomena of nature, which no creature could produce, such as earthquakes, volcanoes, storms, and tempests! These grand scenes of nature are sometimes exhibited before us; and there is none of them which ought not to make us feel the excellence and majesty of the Creator of the heavens and the earth.

Nature presents itself also in a *pleasing* point of view: we see valleys adorned with verdure, and beautiful flowers; fields which promise plentiful crops; mountains covered with trees, vines, and all sorts of simples and medicinal plants. In all these smiling scenes, God shows himself the friend and benefactor of men: he opens his liberal hand, and satisfies every thing with his bounty. This is the season when every thing furnishes the most convincing proofs of his goodness: at present every thing conjoins to delight and flatter our senses, to please and to nourish us.

But the time will soon come in which nature will show itself under a *sad* and *gloomy* form. It will speedily lose a part of its beauty and variety: and resemble a desert, which promises neither riches nor pleasure. Each day brings us nearer to this gloomy season; and the insensible decrease in the length of the days begins already to inform us that we must soon confine ourselves to our apartments. But, even under this form, nature has her attractions; for winter also concurs to the perfection of the world; and without it we should be deprived of the pleasures which spring and summer afford.

Let us apply these reflections to our life. *It* also is subject to variations, and is continually assuming new forms. To the most beautiful and flattering scenes, the most melancholy and distressing often succeed. In prosperity, let us prepare for adversity; and glorify our God in every situation in life.

AUGUST XV.

DAMAGES WHICH MAY BE OCCASIONED BY RAIN.

MODERATE rain always contributes to the growth and fruitfulness of plants: and consequently is a great blessing to the earth. But, in many respects, it may become injurious to vegetables: first, when it falls too vehemently: and secondly, when it continues too long. When it is too violent, it buries the small delicate plants in the earth:

Damages which may be occasioned by rain.

and when too long, it prevents their growth. A superabundant moisture deprives them of the necessary heat ; the circulation of the sap is interrupted ; the secretions are not properly performed ; and the plants droop, and are in danger of perishing.

But this is not the only way in which the rain may become injurious ; although it is the most common. Sometimes it makes terrible *havoc*. When many clouds, driven by impetuous winds, meet with towers, mountains, and other high places in their way, they burst, and suddenly pour out the water with which they were laden. This must occasion great devastation : for as water is not very compressible, it must, when pressed down, run suddenly out ; and fall with the greatest violence from mountains and other heights. Therefore, it is not astonishing if it drag along great stones, beat down trees, and overthrow buildings. Two causes concur to render these effects more violent : on one hand, the great quantity of water which is precipitated ; and, on the other, its velocity, augmented by the height from which it falls : the action of a moving body being always in proportion to the quantity of matter in the body, and the degree of velocity impressed on it.

Waterspouts are still more formidable : their figure is that of an inverted cone : the base terminates in some cloud, their point is turned towards the earth. These waterspouts attract and draw up every thing they meet with in their way ; which is afterward dashed down in the fall of the water. If the point of this pyramid reach the sea, the water boils, froths, and ascends with a terrible noise. But if it falls on ships or buildings, it shatters and throws down the latter ; and it shakes the former so violently, that they often founder. According to all appearance, this meteor is formed by the action of winds which blow in contrary directions ; and which, meeting with many clouds in their passage, drive them with violence against each other. When these opposite winds strike a cloud sideways, they necessarily give it a circular motion, and cause it to turn with rapidity : and in this circular motion, they take the form of a whirlwind ; and their weight being suddenly increased by the force of pressure, they fall with impetuosity, and in their fall assume the figure of a column, sometimes conic, sometimes cylindrical, which turns round its centre with great rapidity. Their violence is in proportion to the quantity of water which falls at once, and to the velocity of the fall.

Cataracts and waterspouts are always dangerous. Fortunately the latter seldom take place at land ; but they are frequent at sea. As to cataracts, the mountainous countries are more exposed to them than those which are flat and level : and they happen so seldom, that many years escape before an acre of land is destroyed by them. However this may be, it is very unjust, when these disasters happen, to murmur against God, and abandon ourselves to complaining and distrust. Many people are grievously afflicted by these events ; they view them on the darkest side, and their imagination magnifies and multiplies the object. When a little corner of the earth, which is

Damages which may be occasioned by rain.

but a point in comparison of the globe, has been ravaged by a water-spout, or any other accident, we complain, as if all nature were in danger of perishing: and, absorbed with these local and transitory disasters, we forget the innumerable blessings which God diffuses over the earth; and which vastly exceed these judgments, which very rarely occur. If we were just, we should be more affected with the order and universal happiness which result from the present arrangement of nature, than with those partial disorders which spring out of the ordinary course of things; and which should be considered only as exceptions to a general rule. Would it not be equally unjust and ungrateful to pay attention only to the earthquakes, tempests, and inundations, which happen upon an average but *once* in many *years*; while we forget so many *daily* blessings, and innumerable benefits, resulting from the constant and regular return of the seasons? Do we not sin against God, when we calculate the damage which some transient accidents occasion; and take no account of the vast advantage which we daily enjoy through the present arrangement of nature? Let us never more render ourselves culpable of such base and criminal ingratitude. Let us rather consider the works of God with humility and admiration: and endeavour to form just and suitable ideas of them. For, doubtless, there are infinite wisdom, order, and goodness, even in those things where we can scarcely see any traces of them; but which will unfold themselves to us more and more, if we endeavour to study nature with an attentive and religious mind.

AUGUST XVI.

THE CARE OF ANIMALS FOR THEIR YOUNG.

THE most remarkable instinct with which God has endued the minds of brutes, is, doubtless, that which they manifest in the preservation of their young. Few animals abandon their eggs, or young, to chance. Their self-love, on the contrary, extends to their posterity; and that in the most solicitous manner, and in a way the most suitable to their different species and modes of life. Some of those little creatures which come out of the eggs of fish and insects, have no need of being hatched by the parent, as the heat of the summer is sufficient to animate and strengthen them; and they are capable of providing for themselves from the moment of their birth, supposing they are in a suitable place, and have food within their reach. The greater part of insects do not live long enough to see their posterity. Fish and amphibious animals cannot distinguish their own young from others of the same kind. Nevertheless, nature inspires them with a knowledge of the best means to provide for the principal wants of new generations. Fish come in shoals to deposite their eggs near the coasts; where the water, being shallow, is easily warmed by the

Care of animals for their young.

heat of the sun ; where they may be more easily hatched, and afterward find requisite food.

Amphibious animals come out of the water, and lay their eggs in the sand, that they may be hatched by the heat of the sun ; as they know that their young will readily find their true element ; and the place where they are destined to live and seek their food. Gnats, and other insects which are born in the water, but live in the air, or on the earth, never fail to lay their eggs where the life of their young should commence. Insects which fly upon the earth, and which in general require no food for themselves, still take care to deposite their eggs on plants, fruit, flesh, and other substances which are proper to nourish their young. There are some which pursue other animals, that they may lay their eggs in their skin, hair, mouth, and entrails. Some animals deposit their eggs in nests, or cells, which they have prepared, and into which they have carried beforehand suitable provision for the nourishment of their young.

Other animals, which cannot provide for themselves as soon as they are born, are entrusted to the care of their parents. How great is the solicitude of birds, even before they lay their eggs ! Every species has its peculiar mode of constructing its nest. With what patience and constancy they sit on their eggs for several weeks, scarcely taking time to eat their food ! What care do they take to warm their young when they are hatched, and to provide suitable food for them ! What courage do they show in defending them, and securing them at the hazard of their own life ! Is it not also a very singular instinct in quadrupeds, to cut with their teeth the umbilical cord of their young ; and to do it also with the necessary precautions, that they may not lose too much blood ! With what tenderness and attention do they suckle them, give them warning of danger, and protect them from it !

In general, the instinct of animals for the preservation of their young, is stronger than the desire of satisfying their own wants. They suffer hunger and thirst ; they refuse sleep and all conveniences, and even hazard their own lives, rather than neglect their little ones. In this instinct, which God has given to animals, we may see such wisdom as we can never sufficiently admire : for the preservation of every species depends on the care which the parents take in hatching and providing for their young. We need not be surprised that *viviparous* animals should feel affection for their young :—they are their own flesh and blood : but, that those which are *oviparous* should feel such solicitude for their eggs, is absolutely inexplicable. The eggs have a widely different figure from the parents ; and in no respect resemble an animal. Besides, the eggs are not visible when the birds begin to build their nests, and when the insects seek places where the new generation may find subsistence.

Adorable Creator of all that exists ! Who would not in this admire thy wisdom ! Who would not acknowledge that goodness with which thou watchest over the preservation and propagation of the animal

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kingdom, that they may minister to our wants, and to our pleasure ! Open our eyes, that we may acknowledge more and more the wisdom which shines through all thy works !

AUGUST XVII.

VARIOUS KINDS OF EXTRAORDINARY RAIN.

EVERY phenomenon, however natural and useful it may be, is often a cause of terror and dismay to ignorant and superstitious men. We see a proof of this in the rains, which superstition considers as supernatural, and which terrify so many people.

Who does not tremble when he hears of a *shower of blood* ? Sometimes, and particularly in summer, there falls a reddish rain, to which this name has been given : or rather, it is supposed that such a rain has fallen, when, after a shower, we find drops tinged with a red colour in the fields. Many believe that such a rain has fallen from the sky, and that it is properly blood. When this is considered, it is no wonder that such rain should be attributed to supernatural causes. There is nothing in it, however, but what is very natural. For the atmosphere being laden with different substances, and with a multitude of foreign matter, we need not be surprised that the rain sometimes partakes of this mixture ; and that its natural colour and qualities are changed. It may very easily happen that coloured particles may fall with the rain. The wind may raise up, and disperse far and wide, the coloured stamina of different flowers, and even the red excrement of certain butterflies. There are also little red insects on the face of the water, which credulous people may take for blood. Sometimes also a certain viscous humour, produced by fatty, reddish particles, which float in the air, falls with the rain, as happened in *Westphalia*, and other places, in the year 1764. But so far from there being any thing marvellous in this, we may rather, on the contrary, be astonished that these phenomena do not happen more frequently.

It is the same with those *showers of sulphur* which are said to fall often. This rain is not properly sulphur ; although it is possible that the atmosphere, being filled with sulphureous particles, some may be detached with the drops of rain. But it has been proved, by a number of experiments, that these showers are no other than the flowers, or coloured seeds of some plants, or fine sand, or yellowish dust, which the wind raises in some countries, and mingles with the rain. The supposed *showers of wheat* are produced in the same way. When heavy rain falls in those parts where much celandine grows, it lays bare the roots, which are very slender ; the little bulbs which adhere to them are separated and scattered about, and these are taken for wheat fallen from above : and superstitious people believe this to be a presage of dearth and famine.

 Various kinds of extraordinary rain.

But whence come all those *caterpillars* with which the gardens and fields are sometimes strewed, when a shower of rain has fallen? Nothing can be more natural than this. As the atmosphere contains a multitude of bodies of every kind, it is very likely that both insects and their eggs may be found there. The latter only require a place to be hatched in, consequently when they are brought down with the rain, they stick to the leaves, and then come to life. That this is possible the following fact proves, related by writers of the utmost probity. The rains which fall in *Philadelphia* during the month of August, bring with them insects, which, when they stick to the human skin, and are not immediately taken off, bite and produce great itching. And when these little animals happen to fall upon woollen cloth, they stick in it and multiply like moths.

We are under very great obligations to those naturalists who, by their researches and experiments, have exposed and rooted up so many superstitious opinions and prejudices. It must however be confessed, that the common people are full of them still; and this proves, that men have in general a greater propensity to error than to truth, and that they are not convinced, as they should be, of the wisdom and goodness of the Divine government. Let us not dishonour both our God and our reason, by these, or similar prejudices. Let the conviction, that every thing is well ordered in nature, and that God proposes infinitely wise ends, be a source of joy and consolation to us. Let us leave superstitious ideas to pagans and infidels: but let us, who have the happiness of knowing the true God, glorify him by our faith; honour him by confiding in his goodness; and labour more to diffuse reason, wisdom, and piety among men.

 AUGUST XVIII.

SENSIBILITY OF PLANTS.

WE may observe certain motions in plants, which make it doubtful whether they have *sensibility* or not. There are vegetables which draw back and contract their leaves when touched. We see some which open and shut their flowers at certain fixed hours of the day; so that these plants show the hour of the day with great exactness. Others assume a very singular form during the night; as they then fold up their leaves: and these motions take place whether they are in the open air, or in close apartments. Those which always live under the water, raise their leaves above it in the time of fecundation. The motions of a marshy plant, which was discovered some time ago in the province of *Carolina*, are still more singular. Its round leaves are garnished above and on the edges, with a multitude of notches, which are extremely irritable. When an insect chancs to creep on the upper surface of the leaf, it folds up, contracts, and shuts up the insect till it dies. Then the leaf opens of itself. We

Sensibility of plants.

may daily observe certain regular movements in some garden plants. *Tulips* expand when the weather is fair ; but they shut up in the time of rain, and after sunset. Vegetables with husks, such as *peas* and *beans*, open their shells when dry, and curl up like shavings of wood. *Wild oats*, when put on a table, will move of themselves, especially if they have been warmed in the hand. And do we not observe that the *heliotrope*, or sunflower, and various other plants, always turn themselves toward the sun ?

These are incontestable facts, of the reality of which any person may be readily satisfied. From these some conclude, that we cannot deny *sensibility* to plants : and it is true, that the above cited facts give some probability to this opinion. But, on the other hand, we do not discover any *other* mark of sensibility in plants. All in them appears to be absolutely mechanical.

We plant a shrub, and destroy it, without observing any analogy between it and an animal. We see a plant bud, blossom, bear seed, as we see the hand of a watch run insensibly round all the points of the dial. The most exact anatomy of a plant can show us no organ which has the least relation to the organs of animal sensibility. When we oppose these observations to those whence some have inferred the sensibility of plants, we remain in uncertainty, and know not how to explain the phenomena related above. Perhaps all we observe relative to the motions of plants, proceeds only from the structure of different fibres, which sometimes contract, and sometimes expand. Perhaps the subtile exhalations of our bodies cause sensitive plants to contract when we touch them. But it is probable also, that, as there are innumerable gradations in nature, there are certain plants which possess the lowest degree of sensibility, and which serve for the connecting link between the animal and vegetable kingdoms ; as there is, in fact, but a short passage between the *sensitive plant* and the *muscle* : thus sensibility may be given to plants, at least, to those which approach nearest to the animal kingdom.

We see then that our knowledge of this subject is very imperfect ; and is almost reduced to mere conjecture. We can neither attribute sensibility to plants, nor deny it with certainty. On this subject we must rest contented with *conjecture* ; and not seek to pass the bounds presented to our knowledge. Let us render to the Creator the glory due to his name : and let us be persuaded, that whatever may become of the question, and whatever the principle of the before-mentioned phenomena may be, the arrangements which He has made in these, and all other respects, have been dictated by unlimited wisdom and goodness. We may very well dispense with the want of more extensive knowledge on this part of the vegetable kingdom : and though this point should ever rest problematical and obscure to us, yet what we know on the subject is sufficient to satisfy a reasonable curiosity, and excite us to glorify God. Let us, therefore, endeavour to make proper use of the knowledge we have, without losing ourselves in speculations more curious than useful ; and without aiming at that

measure of knowledge which is reserved for those who shall succeed us, or perhaps for eternity.

AUGUST XIX.

THE FEAR OF STORMS.

AT the season in which nature presents to our view only pleasing and delightful scenes, well calculated to inspire joy and happiness ; there are still some persons found who spend their time in complaints and murmuring. The summer would, without doubt, be delightful, say they, were it not for those storms which disturb it, and stifle every sentiment of joy in our souls. The fear of storms and thunder are principally founded on the opinion, that they are the effects of God's wrath, and ministers of his vengeance. For if, on the contrary, we considered how much storms contribute to purify the air from a multitude of noxious vapours, and to fertilize the earth ; if we would take proper precautions against the effects of lightning, storms would cease to appear formidable ; and sensible people would consider them as blessings more proper to inspire us with gratitude than terror.

But it may be said, thunder has often made great havoc. How often has lightning struck both men and beasts, and consumed whole villages and towns ! This is all true : but in this, as in many other cases, a terrified imagination greatly magnifies both the evil and the danger. To show how little likelihood there is of being killed by lightning, let it be observed, that among 750,000 persons who died in London, in the space of thirty years, *two* only were killed by lightning. Let us observe also, that during the greatest claps of thunder, many persons prolong their fear without the least reason. He who has time to be terrified, and to fear the natural effects of lightning, is already entirely out of the reach of danger. It is only the lightning that can be fatal to us. When we have seen it, without being hurt, and the thunder does not immediately accompany it, it is doubly foolish to wax pale and tremble at the sound of the clap, or shut our ears for fear of a sound which cannot possibly be dangerous. What should shorten our fears, or entirely prevent them, is the consideration, that after the lightning, we may wait for the thunder in the utmost safety, as it is certain it will do us no more hurt than the distant report of a cannon. Indeed the thunder tells us, we have escaped the danger of the lightning, and informs us how distant it is ; for the greater the interval is between the flash of lightning and the peal of thunder, the greater the distance from the seat of the storm.

The surest means of guarding against the fear of thunder, and other terrible phenomena of nature, is, to endeavour to have a good conscience. The righteous man, calm and composed, fears not the judgments of heaven. He knows, that at the command of God, all

Fear of storms.

nature is armed against sinners. But when even the Supreme Judge terrifies and smites the obstinate, the good man knows that he is ever under the protection of the Almighty. "He hears the thunder roar, but he is not terrified. His Creator, the God whom he loves, is the Ruler of the lightning. He knows when only to terrify, and when to strike. He sports with storms and tempests, and makes use of them to convince the infidel of his existence, who dared to doubt it: and to bring terror into the hearts of the wicked. The friends of God need not tremble: it is their privilege and glory to be able to trust in him, even when his thunder roars. The time shall come when, elevated above the regions of storm, they shall walk upon the clouds by the splendour of his lightnings." Then shall they see the thunder itself is a blessing from the Lord; that he makes use of it to purify the atmosphere; and they shall praise this Supreme Being, who, by an apparatus the most formidable, condescends to provide for the necessities of the earth. With one hand he holds the thunder, and with the other he waters our fields; and thus at once shows himself both our Father and our Judge.

AUGUST XX.

SUMMER EXHIBITS EMBLEMS OF DEATH.

WHEN we walked a few weeks ago in our gardens, we were surrounded by beautiful and pleasing objects; and every thing inspired serene delight. But at present the prospect becomes less agreeable daily, or at least more uniform. The greater part of the flowers which adorned the gardens have disappeared, and we see only their weak remains, which just serve to recall to our minds the charming scene which we enjoyed a few months ago. These revolutions in nature are very instructive. There is a time of life in which we have all the charms of spring; we are then admired and loved; and the most excellent fruit is expected from us. But how often is this expectation disappointed! The blossoms fall off before they had been well expanded: sickness robs us of our charms; and a premature death blasts all our expectations.

We observe the spring flowers, which last till summer, wither then in a few hours. A striking emblem of death! Scarcely a day passes, in which we do not hear of persons snatched away by sudden death when they least expected it:—but God has an infinity of means to put an end to our lives. It is true, that habit renders us almost indifferent about the deaths of so many of our fellow citizens, who are suddenly cut down: and it is not less true, that the days of man are as the grass: he flourisheth as a flower of the field; but the wind bloweth upon him and he is gone, and the place that knew him, knows him no more.

Summer exhibits emblems of death.

We have now reached that season in which we endeavour to screen ourselves from the scorching heat of the sun ; and seek the cool shade of the grove. But are not these retreats well calculated to make us reflect on the silence and darkness of the tomb ? There we shall find rest, after having borne all the fatigue and heat of the day of life.

The mower prepares to cut down his corn. The scythe brings down the stalks on the right-hand and left, and leaves the fields empty and desert behind it. This should remind us of our own lot. All flesh is as grass ; and the glory and duration of human life as the flower of the field. Man flourishes awhile, and is then cut down, when the Lord of the harvest has given his command.

Even the bees teach this truth. When we reflect on the activity and industry with which they collect and prepare their honey, we should learn to lay up treasures of wisdom and goodness betimes, which may be a comfort to us in our old age, and at the hour of our death.

In a little time, the husbandmen will unite to collect the fruits of the earth ; and deposit them in their granaries. These days of harvest are the most solemn, and the most important of all the days in the year. But, O my God ! how solemn will that great day be, when the Creator himself shall collect the harvest ! When all the dead shall rise out of their graves ; when the Supreme Judge shall say to the angels, "gather the tares into bundles to be burnt ; but gather the wheat into my garner." With what joy may the righteous meditate on this day of harvest ! Here, he goeth forth weeping, bearing precious seed, but he shall doubtless come again with rejoicing, bringing his sheaves with him.

These are not the only emblems of death which nature furnishes : but they are the most striking. Every person who considers them, should look upon them as pictures of the shortness and frailty of human life : and we need not be afraid of having that comfort which is so natural to us in summer, lessened by such reflections as these. Meditations on death are the best means of farther embellishing this happy season ; and of rendering it still more agreeable. When we contemplate death in its true light, far from considering it as the enemy of our pleasure, we shall acknowledge that the idea of death ennobles and increases our happiness. Would we run into imprudent excesses in those summer days, if the thought of death were present to our minds ? Would we abuse the gifts which God grants, if we remembered that the hour must come in which we shall give an account of our stewardship ? Would the blessings of this life corrupt or captivate our hearts, if we often considered that the fashion of this world passeth away ? Would the burden which we have to carry during the heat of the day, and the sufferings to which we are exposed, excite murmurs, if we considered that the evening would come and bring us refreshment and rest ? Would we imagine that our chief good consisted in the enjoyment of this

Summer exhibits emblems of death.

world and its pleasures, if we accustomed ourselves to think that a better world, and more dignified pleasures, might one day be our happy lot ?

AUGUST XXI.

CAUSES OF THE HEAT OF THE EARTH.

THE sun is, without doubt, the principal cause of the heat of our globe : and the warmth of a particular place is owing to its relative position to the sun. When he is on the southern side of the earth, the inhabitants of the north have not such warm days as when he approaches the north pole. The same takes place in the southern parts of the earth, when the sun is turned towards the north. In those countries where the sun is nearly vertical, the cold is never so great as to freeze the rivers and lakes ; on the contrary, the heat is always great in those regions. It becomes excessive, when the sun remains a long time above the horizon ; so that his rays fall for a considerable time upon the same place. Hence it is, that towards the poles, where the days are very long, the heat is sometimes intense in certain countries. When all this is considered, we must conclude that the sun, and its relative position towards the earth, is a chief cause of the heat in open air.

But, this is not the sole cause ; if it were, all winters would be equally cold : and the temperature must be always exactly the same in countries situated under the same climate. But, neither of these is the case. It is observed, that on the highest mountains, when even there are spacious plains, and on these plains other hills and plains ; it is still much colder than in low lands and deep valleys. Even under the line, if from a plain, where the heat is excessive, we ascend a mountain 12,000 feet high, we shall feel the most piercing cold, and be in the region of snow and ice.

It has also been further observed, that in winter, when the cold has been rigorous during the day, it has sensibly abated towards midnight ; the weather became temperate, although the rays of the sun did not then influence the atmosphere. It is therefore incontestable, that there is a warmth in the air which is not immediately produced by the sun.

There are substances which warm and take fire by percussion, and by friction. The axle-trees of wheels take fire when carriages run too fast, and have not been properly greased. Other substances warm and take fire when they are mixed together. If a certain quantity of water be poured on a bundle of hay and straw, a considerable degree of warmth will take place. Substances which corrupt, or ferment, acquire a degree of heat which may be perceived by the thermometer, or by the touch. Even in the air, the motion of certain matters may occasion mixtures, dissolutions, and combinations, which may produce a great degree of heat. Thus we may ac-

Causes of the heat of the earth.

count for the production of heat in the open air. The sun, in the first place, is the principal cause of it: to the heat which proceeds from this planet, that of several living creatures are united, that of fire excited by wood, coal, and other combustible matters; that which comes out of the bowels of the earth, the depth of the sea, and from warm mineral springs. The heat is often very much increased by the fermentations which different bodies undergo; whether on the surface of the earth, or in the upper regions of the atmosphere, where they produce warm exhalations. When, therefore, all kinds of particles which float in the lower atmosphere, and which are proper to receive and preserve heat, are not cooled, nor dispersed by the winds and rain, the heat increases by degrees and becomes more and more intense. On the contrary, it is diminished when any of the above causes ceases to act.

All these plans are worthy of the wisdom and goodness of God. They are useful to all parts of the habitable globe: and the Creator has assigned to all climates that measure of happiness of which they were susceptible. But, we who live under a temperate climate, prove, very sensibly, the paternal cares of the Most High. Heat and cold are distributed to us in the wisest proportion: and we should be the most ungrateful of men, did we not acknowledge and celebrate the bounty of God towards us,

AUGUST XXII.

VARIETY OF PLANTS.

ONE of the many things worthy of our admiration in the vegetable kingdom, is the great variety observable in plants. They are diversified in respect to their *parts*, their *generation*, their *productions*, and their *virtues*.

The manner in which *fructification* is performed in many plants is very obscure. Little is known concerning its process in *mosses*, *mushrooms* and *ferns*. There are plants which exhibit singular monstrosities. We see flowers which have no tops; there are some, out of the middle of which other flowers spring. Certain plants are termed *sleepy plants*, assume a different situation at the approach of night to what they had in the course of the day. Some turn towards the sun, others draw back and contract when they are touched. There are flowers which open and shut at certain regular hours; or in particular states of the weather. Some grow up, flourish, bear fruit, and lose their leaves, sooner than others. Plants differ also, with respect to the *place* of their growth; some choosing one place in preference to another. All plants are originally wild; i. e. they grow of themselves without culture.

The Creator has assigned to plants different climates suited to their nature and uses; and where they may best come to their perfection.

 Variety of plants.

But, those which are *exotics* may be naturalized among us, and succeed very well, provided care be taken to procure them a degree of warmth suitable to their nature.

What delights our eyes most in plants is, their great variety of forms. Let the most perfect species be compared with those which are least so : or let the different species of the same genus be compared ; and we cannot but admire the astonishing variety of models, according to which nature works in the vegetable kingdom. We pass from the *truffle*, to the *sensitive plant* : from the *mushroom*, to the *carnation* ; from the excrescence on the *cherry-tree*, to the *lilac* ; from the *nostock*, to the *rose-bush* ; from the *moss* on the *cherry-tree*, to the *mould* on the *chestnut* ; from the *moril mushroom*, to the *oak* ; from the *moss*, to the *lime-tree* ; from the *missle-toe*, to the *orange-tree* ; and from the *ivy*, to the *fir*.

If we consider the numerous families of *mushrooms*, or the different kinds of plants which are termed imperfect ; we cannot but admire the fecundity of nature in the production of those vegetables, which are so different in their form from others, that they can scarcely be ranked in the number of plants. If we ascend a few steps on the scale of plants, we behold, with pleasure, the series of plants with stalks, from the grass which grows between stones, to the inestimable plant to which we owe the principal part of our nourishment. We, in the next place, observe the vast variety of creepers, from the tender *bind-weed*, to the *vine*.

What we can never sufficiently admire in the works of nature is, that the most perfect *harmony* prevails among this great *variety*. All plants, from the *hyssop* which grows on the wall, to the *cedar* of Lebanon, have the same essential parts. A little herb is as complete a plant as the most perfect *rose* : and the *rose* is not less perfect than the most stately *oak*. All appertain to the same monarchy ; all follow the same general laws of growth, proportion, and multiplication ; and, nevertheless, each species is distinct from the other. Among so many thousands of plants, there is not one but has its distinct characteristic properties, particular manner of receiving nourishment, of growing, and perpetuating itself. What inexhaustible riches do we discover in their forms, colours, and proportions.

They are highly privileged, who are capable of observing these varieties ; and of relishing the different beauties of the vegetable kingdom. What pleasure may the human mind find in this study ! After having entered fully into the spirit of this delightful employment, we can renounce all others with ease, to make this our only study. The soul, enraptured with these delightful meditations, shall ascend to thee, O God, who art the Father of nature ! Thy power has produced all these plants ; thy wisdom has properly arranged them ; thy goodness manifests their endless variety, and affords us continual subjects of praise and gratitude to our Creator. And can we omit a duty to which all nature invites us, without having the

 Variety of plants.

most insensible and ungrateful heart ! And can we indulge such a spirit, and hope for the love and approbation of our Maker ?

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AUGUST XXIII.

GENERAL REFLECTIONS ON THE ANIMAL KINGDOM.

WE may consider the animal kingdom as a well governed state, where a proper number of inhabitants are found, and each in the place assigned to him : all have necessary faculties for their different avocations : they are induced to fulfil their appointments by rewards and punishments ; and are sufficiently protected against their adversaries. In this republic of animals, those which are small and feeble, are in subjection to the strong and powerful ; but all are in subjection to man, as the representative of the Deity. The inhabitants of the animal kingdom find every where a sufficiency of employment and food. They are dispersed every where, and their nature, their different constitutions, and their organs, are suited to the different residences assigned them.

Their employments are various : but all tend either to the increase of their species, to maintain a constant equilibrium between the animal and vegetable kingdoms ; or to provide for their own subsistence, and to defend themselves against their enemies. We may observe, that all the parts of their bodies are adapted to their functions, and to the nature of their minds. The Creator has given them certain instincts, which compensate them for that reason of which they are deprived : instincts diversified in a thousand ways, and appropriated to their different wants : instincts for motion, instincts for food, to enable them to discern it infallibly, to find it out, to seize it, to prepare it, &c. Instincts for the constructing of nests, and other necessary places of abode ; to hoard provisions, and to go through their different changes. Instincts for the propagation of their species, to defend and preserve themselves from their enemies, &c.

In each class of animals, there are some that live on prey ; and on the individuals which superabound in other classes. Each species has its peculiar enemies : hence it is that none can multiply too fast, and the proper balance is kept up. Sickly animals, or those which have some defect, are ordinarily the first which become a prey to the others : corrupt fruits and carcasses are devoured ; and the earth is not incommoded, nor the air infected by them ; and thus nature preserves its lustre, its bloom, and its purity.

Beasts of prey have a make conformable to their manner of life : they are either endued with particular strength, or great agility, industry, or cunning. But, in order to prevent them from destroying whole species, they are confined within certain limits ; they do not multiply as fast as other animals ; and often they destroy one another ; or their young become a prey to other creatures. Some sleep

Reflections on the animal kingdom.

during the winter, digest their food slowly, and feed on the fruits of the earth, when they can get no other food. Weak animals are provided with means of defence, adapted to the places of their abode, and the dangers to which they are exposed : their natural weapons, their agility, their dwellings, their scales, their cunning, preserve them from destruction : and by these means, the proper balance is always kept up in the number of every species in the brute creation.

Animals are, in some measure, obliged to perform the functions assigned them ; because on this their happiness depends. They find their well-being in following the laws which nature has prescribed ; as, on the contrary, they cannot transgress them without necessarily bringing on themselves all sorts of evils. The *mammalia*, or animals which give milk, are the largest, and consequently the fewest in number ; but they fulfil very important offices. The functions of birds are also very much varied ; they eat up superfluous grain, devour dead carcasses, and lessen the number of every species of insects.

Most amphibious animals prey on others. The smallest animals are the most numerous ; and they are more voracious in proportion to their size. They manure many vegetables, and serve many other useful purposes.

All the admirable things which we see in the animal kingdom, demonstrate the existence of a Being who possesses all the treasures of wisdom and knowledge. Who, besides himself, could have peopled this vast globe with so many animals of different kinds ; and could provide them all that was necessary for their life and their well-being ? Who, but God, could have nourished that infinite number of creatures according to their different tastes ?—could have provided them with coverings, places of abode, weapons for necessary defence ; and given them all so much address and sagacity, so many instincts and capacities ? Who but he, could have preserved the balance between so many different species and classes of animals ? Who but the All-Wise, could have assigned to every living creature its proper element ; form that innumerable multitude of limbs, joints, bones, muscles, and nerves, joined and articulated with so much art, harmony, and perfection ; that each animal may perform its different motions in a manner the most convenient, and best adapted to its way of life ; and to the different situations in which it might be found ?

Yes, Lord God Almighty, it is thou alone who couldst do all these things ! And to thee all the glory, praise, and thanksgiving, belong. It is to thee alone that we owe homage and gratitude for all that thy hands have formed. The contemplation of the animal kingdom, and the innumerable conveniencies which accrue to us from it should excite us to pay thee that tribute of love and gratitude which to thee alone is due.

AUGUST XXIV.

THE DIVISION OF THE EARTH.

ALL the known world is divided into four principal parts ; Europe, Asia, Africa, and America.

Europe is the smallest. Its length from east to west is reckoned above 3,600 miles, and its breadth from north to south about 2,700. Its inhabitants possess many countries in different parts of the world ; and have nearly one half of the earth under their subjection. The Europeans alone travel into the four different parts of the globe ; and bring thence the productions of all countries. They are the most enlightened of all people ; and those who cultivate the arts and sciences with the greatest success.

Europe is the only part of the earth where the land is every where cultivated, and the whole surface filled with cities, towns, and villages, whose inhabitants keep up a constant intercourse with each other ; and profess nearly the same religion. The other three parts are inhabited by a number of different people, who have no connexion with, and little knowledge of each other ; and who differ much in their customs, manner of life, and in their religion.

Asia is inferior in size only to *America*. Its supposed extent, from the straits of *Gallipoli* in the west, to the eastern shore of *Tartary*, is 4,800 miles ; and its breadth from the southern extremity of *Malacca*, to the frozen ocean, is nearly 4,500. As the countries which are found in the interior part of this continent, enjoy not the cooling air of the sea ; as they are not watered by many rivers ; as they have vast plains, and barren mountains : the heats and colds are excessive ; the land is not very fertile, and consequently not well cultivated. Even at the present time, those inland countries are only inhabited by people, who, in the morning, pull down their cities and villages, carry them some miles with them, and build them up again at night in less than an hour.

It seems as if nature had rendered this unsettled and wandering life necessary ; and intended that the establishments, laws, and government of this people should have less consistence, and be more subject to change, than those of others. The other inhabitants of Asia have often suffered much from the restless and unquiet character of this vagabond people. The northern part, which is full of lakes, marshes, and forests, has never been regularly inhabited : but the southern, eastern, and western parts, are the most beautiful countries in the world ; especially those which are situated towards the south. These are extraordinarily fertile, and produce, in abundance, every thing necessary for the support and comfort of life.

America is the largest division of the known world ; it is bounded, as far as yet has been discovered, on all sides by the ocean : and extends from the 80th degree of north latitude, to the 56th south : and from the 35th to the 136th west longitude from *Greenwich*. It is

 Division of the earth.

nearly 10,000 miles in length from N. to S. Its average breadth from E. to W. is between 1400 and 1500 miles ; but at its broadest part it measures 3,690 miles. It is said to contain upwards of 14,000,000 square miles.—*America* was discovered by *Christopher Columbus*, in 1491 : but it got its name from *Americ Vespuce*, a Florentine, who discovered the continent south of the line in 1497. It is divided into two continents, separated by the isthmus of *Darien* : which, in the narrowest part, is scarcely sixty miles across. The cold which prevails in the northern part ; the few useful productions that are found in it ; its distance from other inhabited countries ; are the causes why it is so little known ; but we have room to believe, that the natural inhabitants of the country are not civilized. Forests and marshes still cover the land ; and hitherto the Europeans have only cultivated the eastern parts. In South America, there were formerly great empires ; the remainder was inhabited by savages. Serpents, reptiles, and insects, are much larger here than in Europe. In general, we may say that America is the most extensive, and the worst inhabited part of the world.

Africa extends nearly from 37° south latitude to 37° north ; and is about 4,300 miles in length ; and its greatest breadth from *Cape Verd* to *Cape Guardafui*, is 3,500. Its form has been compared to a pyramid ; the *Cape of Good Hope* being supposed the summit, and the northern coast along the *Mediterranean*, its base. As it is under the torrid zone, there are immense sandy deserts, mountains of a prodigious height, forests almost burnt up, and monsters of every kind. The excessive heat enervates and enfeebles the faculties of the soul ; and very few well governed states are to be found in it. Though Africa is the most contiguous part of the world to Europe ; yet the interior of it is, as yet, but little known.

If we calculate the number of leagues which these four parts of the world occupy, their size will appear very considerable : yet all the countries actually known, do not make one fourth of the globe ! And what is our earth, in comparison of those immense bodies which God has placed in the firmament ! It is lost in that innumerable multitude of the celestial spheres, as a grain of sand is lost in a mountain. But, to us, in whose eyes a cubit is a considerable length, the terrestrial globe is always a vast theatre of the wonders of God. And as we know but little of the worlds which are above us, let us endeavour to know that well which we inhabit, and use that knowledge to the glory of our Creator.

 AUGUST XXV.

THE NATURE AND PROPERTIES OF LIGHT.

EVERY moment we feel the utility of that light which is diffused over our globe ; but we cannot, with certainty, determine what its nature is. All that the greatest philosophers have said on the subject

The nature and properties of light.

is but conjecture. Is it enough to say, that light is a fluid which encompasses the earth, and requires only to be agitated by the sun, or some other inflamed body, in order to render it perceptible? Or, is it fire itself, which, by the emanation of its infinitely fine particles, gently strikes our eyes at a certain distance? The first hypothesis has been adopted by the most eminent philosophers. It is certain, at least, that there is a great difference between *fire* and *light*. The latter is incomparably more subtile than the former. It penetrates glass, and other transparent bodies, in a moment; whereas fire does it very slowly. The pores of glass are consequently large enough to give a free passage to the light, while the fire meets with more resistance, because it is less subtile. Fire moves more slowly than light. Let burning coals be brought into a room, the heat diffuses itself very slowly, and the air becomes warm by degrees: but the moment a candle is brought into an apartment, the whole is suddenly illuminated; and wherever the rays can reach, the parts become visible. From these facts, and some others, it is concluded, that fire and light are different substances; although we generally see them both together, and find that one may produce the other. But the consequence drawn from this is possibly false.

The properties and effects of light are not less incomprehensible than its nature. The rapidity of its motion is prodigious. If its velocity were no greater than that of sound, it would take up seventeen years to come from the sun to the earth. But, from very accurate observations of some eminent philosophers, it appears that light passes from the sun to us in *eight minutes and twelve seconds*. In the short space of *one second*, a particle of light traverses an extent of *one hundred and seventy thousand miles*! Now as sound is propagated only at the rate of 1142 feet in a second, a particle of light must be 786,000 times more subtile than a particle of air; although the latter cannot be perceived by the naked eye, nor by the assistance of glasses with the greatest magnifying powers. Further, the observations of astronomers inform us, that the rays of a fixed star, in order to reach us, must traverse a space which a cannon-ball, shot with the greatest force, could not pass over in less than 104,000 millions of years! The expansion or extent of the propagation of light is not less inconceivable. The space in which it is diffused is not less than the universe itself; the immensity of which exceeds the limits of the human understanding. It is by this almost unlimited diffusion of light, that the very remotest of the heavenly bodies in the solar system, becomes discernible either by the naked eye, or by telescopes. And had we instruments that could carry our sight as far as the light is extended, we could not discover those bodies which are placed at the very extremity of the universe.

It is certain that our understanding is too limited to comprehend all the designs of God, relative to the nature and properties of light. But it is not less true, that we might explain many things, did we consider them with sufficient attention. Why, for instance, does the

The nature and properties of light.

light propagate itself with such an inconceivable velocity, but that an endless multitude of objects may be perceived at the same time by an infinity of persons? If then the rays of light move so swiftly, is it not that we may instantly discover the most distant objects? Were the propagation of the rays of light slower, great inconveniencies would result to the inhabitants of the earth. The strength and splendour of the light would be greatly weakened; the rays would be less penetrating; and the darkness would be very slowly dissipated. Why are the particles of light so infinitely subtile, but that they may paint even the minutest objects in the eye? Why have not these particles more density, but that they may not dazzle us by their splendour, nor injure us by their heat? Why are the rays refracted in so many ways, but that we may the better distinguish the objects which present themselves to the eyes!

Thus the Creator ever keeps in view the gratification and benefit of his creatures. What gratitude do we owe to this *Father of lights*, for arrangements so wise and beneficent! Had he not created the light, how could we have enjoyed life? Of how many sources of pleasure should we have been deprived! And within what narrow limits would our occupations and knowledge have been confined!

AUGUST XXVI.

THE FORMATION OF BIRDS.

BIRDS are, undoubtedly, to be ranked among the most beautiful creatures on the earth. The form of their bodies even in their smallest parts, is so regular and perfect, as sufficiently to prove the wisdom of the Creator. Like the *mammalia*, or animals which give milk, they have real bones; but they are differently clothed. The bodies are covered with feathers fastened in the skin, laid one over another in a regular order, and furnished with a soft and warm down. The large feathers are covered above and below with smaller ones. Each feather consists of a *quill* and *beards*. The *quill* is hollow below, and by it the feather receives its nourishment: towards the top it is full of a sort of marrow. The *beards* are a range of little thin flat flakes, closely connected at the two edges. Instead of having fore-legs, like a quadruped, birds have two wings; these are composed of eleven bones; in the muscles of which the feathers intended for flight are set. These feathers turned back, form a species of vault fortified by two rows of smaller feathers, which cover the root of the larger ones. The mechanism of the wings is truly admirable. They do not strike behind like the fins of fish, but they act perpendicularly against the air which is under them, which greatly assists the flight of birds.

The *wings* are hollowed a little that they may take in more air, and the feathers are so closely united, that the air cannot pass through

Formation of birds.

them. The body is suspended between the two wings in a perfect equilibrium, and in the most convenient manner for them to execute their different motions. The heads of birds are made small, that the weight may not retard the vibrations of the wings ; and to be more proper to divide the air, and make their way through that element. The principal use of the tail is not to supply the place of a rudder, but to preserve the balance in flying, and to assist the bird to ascend or descend in the air. The *legs*, never more than two, are so placed as to preserve the body in the centre of gravity. In some birds, they are placed so much behind, that they can only be used in swimming. The *limbs* are composed of the *thighs*, of the *legs*, properly so called, and the *claws*. The thighs are covered with muscles, and generally with feathers. As to the legs, they are lean, and ordinarily naked. Most birds have four toes, three of which are before, and one behind. At the end of the toes they have nails, which they use either to assist them to perch, seize their prey, or take up their food. Some birds feed on animals, and others live on plants, particularly their fruits and seeds. Those which live on seeds, steep and soften them in their crop. Whence there can pass but a small portion of food at a time into the stomach, because in this sort of bird it is very small. Their stomach is composed of very strong muscles, by means of which the food is the better broken and ground : and ordinarily such birds swallow sand, and little rough pebbles, to assist digestion. Birds of prey have a weaker stomach, and they have recourse to small stones to assist its operations.

Not to see evidences of the wisdom and providence of God, in the formation of birds, would argue a total want of reason. The bodies of birds are formed throughout with so much art and harmony, that they are perfectly conformed to their manner of life, and to their different necessities. The *stork*, and the *heron*, who must seek their food principally in marshes, have very long bills, and long legs, that they may run in the water without being wet, and reach far in to seize their prey. The *hawk*, and *eagle*, which live on rapine, are provided with large wings, strong claws, and large beaks ; which are necessary to preserve them from starving. The *swallows'* bill is small and pointed ; their mouth is large, and cloven up to the eyes ; on the one hand, that they may not miss the insects which they meet with in flying ; and on the other, that they may pierce through them the more easily. The *swan* has a particular reservoir in its wind-pipe, whence it draws in air enough to breathe, while seeking its food with its head and neck plunged under water. Several little birds, which fly and hop among the thickets, have a little membrane over their eyes to defend them from injury. In a word, the formation of each bird is admirably appropriated to its manner of life, and to its wants. Each species is perfect in its kind ; and none of their members is superfluous, deformed, or useless.

The wisdom observable here will appear still more admirable, when we consider that all the parts of birds are not only appropria-

ted to their different necessities, but they also concur to give them the most beautiful shape. What an astonishing diversity of construction, proportion, and colour, do we behold from the *raven* to the *swallow*; from the *partridge* to the *vulture*; from the *wren* to the *ostrich*; from the *owl* to the *peacock*; and from the *crow* to the *nightingale*? All these birds are beautiful and regular in their kind, but each has its own peculiar beauty.

Thus a sight of the birds may become useful and edifying to us, if we accustom ourselves to contemplate the Creator in them. Happy would it be for us if we made this use of the creatures: what a pleasing employment, what pure and heavenly pleasures, might such contemplations afford us!

AUGUST XXVII.

REFLECTIONS ON THE SKY.

WE have only to cast our eyes on the sky, to be struck with admiration at this magnificent work of the Creator. With what splendour does this sapphire vault shine, this rich canopy spread over our dwelling, especially during the night, when thousands of lustres are suspended from it, and the moon diffuses her mild light far and wide! Who can lift up his eyes and contemplate this ravishing sight without astonishment, without the sweetest emotion! But we discover still many more wonders, when the eye of the mind traverses this immense space, and makes it the subject of its meditations. Where are the bounds of this space! Where its beginning! Where its end! Innumerable spheres, of a prodigious size, are raised one above the other; and the human mind that would attempt to follow them in their rapid career, must soon feel its own weakness. A pure ethereal air, infinitely subtile, fills the whole space: it supports these prodigious masses, and marks out the orbits in which they continually revolve. There are neither props nor pillars to support this immense arch, and the enormous load which it carries: it is neither suspended nor attached to any thing; nevertheless, it has supported itself thousands of years, and will continue to do so for ever.

How great is the number, how vast the bulk, of those celestial bodies with which the ether is filled! The magnitude of the sun, and that of several planets which move round it, is vastly superior to that of our earth. And who knows but among the stars there may be found many equal, if not superior in size, to the sun himself! Their prodigious distance causes them to appear as brilliant points in the sky; but in reality they are so many suns, whose immense circumference cannot be measured. The eye, unassisted with glasses, discovers an innumerable multitude of celestial bodies, when, during the night, they are permitted to sparkle in the absence of the sun. But how many more do we discover by the help of a telescope! And

 Reflections on the sky.

is it not probable, that there are multitudes of others which we cannot discover, because they are out of the reach of our best instruments? We may venture to assert, that thousands of suns and worlds roll in the ether; and that the whole of the solar system is but the smallest part of that great host, which is ranged above us in such beautiful order.

All this should fill us with admiration: but the sky presents to an attentive mind greater wonders still. These bodies are in a continual motion, which is subject to invariable laws. They all turn round their own axes; and the greater part revolve, in immense circles, round other globes. A particular path is assigned to each, from which it never departs. They run their career with a rapidity that surpasses human imagination. They have a power by which they fly from the centre; and nevertheless an equal force retains them in their orbits. Though so many thousands of bodies roll in this space, yet they never strike against, nor incommode each other. The stars which appear to us dispersed with so much confusion in the firmament, are, on the contrary, placed there in the best order, and in the most perfect harmony. For thousands of years they have risen and set regularly in the same manner: and astronomers can foretell, with the utmost certainty, their position and their course. What new subjects of admiration should we have, had we a more extensive knowledge of these innumerable globes! But we know little besides the system to which our earth belongs; and of which the sun is, so to speak, the monarch.

Who can lift up his eyes and contemplate the heavens, without being struck with astonishment at the idea of that Supreme Being who has formed this magnificent work! Let this admiration lead us to humble ourselves in the dust before him, and to adore and glorify his name. And while we acknowledge how weak and imperfect our homage is, let us look forward to that glorious change which shall one day take place in us; when a nearer contemplation of those wonders, which we now see obscurely, and at a distance, will make our hearts overflow with gratitude and joy!

 AUGUST XXVIII.

MORAL REFLECTIONS ON A CORN-FIELD.

THIS field was lately exposed to great dangers. Impetuous winds whistled round it; and the storm often threatened to beat down and destroy all the ears. Nevertheless, Providence has preserved it to the present day.—Thus, the tempests of affliction often threaten to overwhelm us: yet these storms are necessary; they often become means of our purification, and of rooting up the tares of sin. Often, in the midst of trouble and sorrow, our knowledge, faith, and humility, are increased and strengthened. It is true, that like the

Moral reflections on a corn-field.

weaker stalks of corn, we often bend, and are bowed down to the earth : but the compassionate hand of our Father supports and raises us up again.

As the harvest approaches, the corn ripens very fast. The dew, the heat of the sun, and the showers, unite to bring it to its maturity. May we daily ripen for heaven ! And may all the events of our lives lead to this salutary end ! Whatever our situation may be here below ; whether the sun of prosperity shine upon us, or our sky be clouded with adversity ; whether our days be gloomy or serene, may all concur to perfect our piety, and fit us more and more for eternity !

It is worthy of observation, that those stalks which carry the largest and finest ears, differ much in height from those which are poor and light. The latter stand erect, and overlook the whole field, while the others bend under their own weight. These are emblems of two sorts of professing Christians. We see some who are vain and presumptuous, who, having but a small share of religion themselves, act insolently towards others ; and regard the truly pious with contempt. A foolish presumption blinds them, and causes them to disdain the proper means of salvation. Those, on the contrary, who are rich in grace, and abundant in good works, bend modestly down, like the well-filled ears.

All the corn which is to be cut down, is not equal in goodness. How many tares and weeds are mixed with the corn ! Such is the state of many Christians in this world : for a long time we observe in them a mixture of good and bad qualities : and their natural corruption, like tares, often hinders their progress in righteousness. A field of corn is not only the emblem of a Christian in particular, but also of the Church in general. The profane and the wicked often sow, by their evil example, tares in the field where there should be nothing but good seed. The great Proprietor of the field permits those tares to remain for a season : he exercises patience and long-suffering ; and will not give free course to his justice till the time of harvest, the great day of retribution. Behold with what eagerness the country people run to collect the fruits of the earth ! The sickle levels all before them. Thus death brings all to the dust, the great and the small, the rich and the poor, saints and sinners !

But what does this noise in the fields mean ! Oh ! it is the sound of joy and gladness at the sight of an abundant crop. O that they were also the cries of praise and thanksgiving, to celebrate the goodness of God, from which all these blessings proceed ! But how joyful shall the righteous be in the great day of the harvest ! With what unutterable love shall their hearts overflow, when they are introduced into the blessed society of angels, and the spirits of just men made perfect ! Then shall they remember, with gratitude, their former labours and suffering ; the dangers and tempests through which they have been safely brought ; and their hearts and voices shall be united to magnify that beneficent Father who has watched over them. Let

this pleasing hope support us in the time of trouble ; let it comfort us in our sufferings ; and cause us patiently to wait for the great harvest day !

AUGUST XXIX.

SHELL-FISH.

SHELL-FISH, or testaceous animals, constitute a very considerable part of the animal kingdom. They live in houses of a substance more or less calcareous, which may be considered as their bones. Their shells are either *univalve*, i. e. of one piece ; or *bivalve*, or *multivalve*, i. e. composed of two or more pieces. Testaceous animals form two large families : the *muscle*, the shell of which consists of more than one piece ; and the *sea-snail*, whose shell is in one piece, and generally spiral. The construction of the former is much more simple than that of the latter. *Muscles* have neither head, horns, nor jaws. A windpipe, a mouth, and sometimes a species of foot, are all that can be distinguished in them. The greater part of the *snail* kind have, on the contrary, a head, horns, eyes, and a foot.

There is great variety among shell-fish relative to generation. In some the sex is discoverable ; others are hermaphrodites ; and some seem to be of no sex. Some are *oviparous*, others are *viviparous*. Testaceous animals are born with their shells on them ; but in proportion as the animal grows in his house, (the interior walls of which are covered with a very fine membrane) it increases also, not only in thickness by layers one over the other, but also in circumference ; because the circumvolutions or spires, multiply more and more. The shells are formed by a viscous liquid, which transpires from the animal ; and which grows hard, and thickens by degrees. But whether shells grow by an external juxtaposition, or by inward nourishment in the ordinary way, has not been absolutely determined. However, it is most likely that they are formed in the way first mentioned. Most shell-fish live in the water, and especially in the sea ; sometimes near the shore, and sometimes in the main ocean.

Some are carnivorous, others feed on plants. Some stay at the bottom of the sea : others stick immoveably to the rocks. *Oysters*, and many other animals with hard shells, attach themselves to different substances, and continue firmly united to them, by means of a glutinous, gritty liquor : and often they are cemented one to another in heaps. This adhesion is voluntary in some shell-fish, which fasten themselves as occasion may require : but it is involuntary in others, which continue always immoveable on those rocks to which they fasten at first.

The knowledge we have of various animals is still very imperfect. As they mostly live in the bottom of the water, it is very difficult to make exact observations on their formation, mode of life, food,

 Shell-fish.

propagation, motions, &c. As yet we know but *three* or *four* classes of shell-fish; but it is very likely that hundreds of others might be discovered, could we carry our researches to the depths of the sea, and the bottoms of rivers. Hitherto we have scarcely attended to any thing besides the beautiful shape and colours of shells; but the true construction and manner of life of the animals which inhabit them are still very little known; and we know almost nothing of the end for which they were formed. Nevertheless, this class of animals furnishes us with subjects sufficient to lead us to admire the infinite grandeur of God. How immense is his empire! In every place we find creatures, each of which, in its particular order, bears the signature of the Divine Majesty. To be convinced of this, we have only to enter into the cabinets of those who preserve the shells of these animals. Let us consider the prodigious diversity manifest in their size, form, and colours.—Here the finger of God is visibly shown; and every thing convinces us that he has proposed ends highly worthy of his wisdom and goodness.

 AUGUST XXX.

ON THE GOVERNMENT OF GOD.

A GOD who, from his supreme elevation, could be an indifferent and idle spectator of all the revolutions which take place in this world, would not be worthy of our homage. Happy for us, that the government of the God we adore comprehends all his creatures. Every where we may find the *centre* of his empire, but we no where find its *limits*. All his works are continually before his eyes. He sees the past, the present, and the future, at one glance, and comprehends all their relations and dependancies. The least events, the most trifling circumstances, so far from escaping his notice, enter all into the plan which he has formed to accomplish the infinitely wise and holy ends which he has proposed. And all these ends unite and concentre to produce the greatest possible degree of happiness to his creatures. Yes, God takes pleasure in his works; with one glance of his eye he sees the whole; and with a single act of his will he governs all. His laws are dictated by infinite wisdom, and his commandments are a source of joy and happiness.

God by his providence preserves the different species of creatures which he formed in the beginning of the world. Animals die, but others come in their place. Generations of men pass away, and others succeed them. The Ruler of the world makes use of inanimate creatures to preserve and render those that live happy; and finally, he subjects the whole to man, who, of all his creatures here below, is alone capable of knowing his works and adoring him.

This God, who is holiness itself, wills that all his creatures should be holy. By the continual proofs which he gives them of his love

On the government of God.

for goodness, and his hatred to evil, he speaks to their hearts, and necessarily encourages them to walk in the way he has pointed out. He directs their actions to this end: he renders their designs abortive when they are contrary to his merciful views: and he furnishes them with means to avoid the paths of iniquity. What wise measures did he make use of to lead the children of Israel to the blessed ends he proposed! In vain did the idolatrous nations more than once conspire to destroy them; they were still supported by the protection of their God. He neglected nothing to maintain his pure and holy religion among them; which distinguished them from the idolatrous people around.

But our God dwells in light inaccessible. There are depths of wisdom in his government which no creature can fathom. Our understanding is too weak to comprehend the whole of the plans of the Lord, so as to form just ideas, before the event has unfolded them. Our knowledge is too limited to penetrate the infinitely wise counsels of the Divine Being; and to discover, before-hand, the motives of his conduct, and of his dispensations. The wicked often sit among princes, while the righteous pine in the dust: the wicked triumph, and the good man is oppressed. Every thing smiles on the bad, while the friend of God meets with nothing but affliction and loss.—And yet there is a Providence.—Yes, notwithstanding all these apparent disorders, the Lord is ever the tender Father of his creatures; *their* God infinitely wise; and *their* just and equitable King. He should be adored in all his dispensations, however impenetrable they may appear to us. His counsels are marvellous: his plans surpass our understanding: all that takes place in this world, and which so often astonishes, us tends to the accomplishment of the most excellent designs. That load of affliction and misery under which we groan, may possibly have the happiest influence over our future state, this apparent evil is probably an indispensable remedy for the soul; and on this salutary chastisement, the perfection of our faith, the purification of our heart, and our eternal felicity may, in a certain measure, depend. O thou who art discontented with thy lot, consider these things, and thou shalt cease to complain. “Why, O man, dost thou undertake to fathom those purposes according to which God governs the world? Thy understanding is limited, and yet thou pretendest to discover the views which an infinite Being proposes to himself! Thou canst not comprehend the connexion of those things which pass under thy notice; thou art ignorant of that which went before, and of that which must follow; and nevertheless thou hast the presumption to decide concerning causes and effect! Providence is just in all its plans; and in all its dispensations. It is true that thou canst not always see the motives of his conduct: to be able to comprehend them, thou must be what God is.”

 Harvest hymn.

AUGUST XXXI.

A HARVEST HYMN.

OUR fields, crowned with ears of corn, are a hymn of praise to Jehovah: the joy which sparkles in the eyes of the reaper, is a hymn to the God of Nature. It is **HE** who causes bread to spring out of the earth; and who loads us with his blessings. Come, let us assemble and sing unto the Lord; let his praise be for ever the subject of our songs. Let us listen to the voice which we hear from the bosom of our fruitful fields. "The year shall crown thee with its blessings. O world, thy happiness is my work. I have called forth the spring; the harvest and its produce are the works of my power. The fields, by which thou art supported, and the little hills covered with corn, are mine." Yes, O Lord we see thy Majesty, and feel the value of thy favours. It is by thee that we exist; life and its supply are presents from thy hand. Blessed be thou, O field, which producest good for man. Flourish, thou beautiful meadow; clothe yourselves with thick foliage, O ye forests! God of nature, be thou ever beneficent towards us! Then, from the dawn of the morning, to the close of the day, the Lord shall be the object of our praise: free from anxiety, we shall rejoice in his benefits, and our children shall repeat after us: "The God of heaven is our Father: the Lord, the Lord, He is God!"

AUGUST XXXI.*

THANKSGIVING FOR GOD'S PROVIDENTIAL CARE OF HIS CREATURES.

LORD, thou art worthy to receive glory, honour, and praise. Lord, my God, my Redeemer, my Rock, and my High Defence. My soul blesses thee. I will publish thy wonders: I will rejoice and be glad in thee, and celebrate thy name, O thou Most High!

I give thee thanks for that immortal soul which thou hast given me; which thou hast redeemed by the blood of thy Son; and which thou sanctifiest by thy grace.

I praise thee for the body thou hast given me, and which thou still preservest in health and strength; for these limbs, so well adapted to their ends: and senses, which are still preserved in strength and vigour. Eternal Source of life and happiness! To thee I owe my being, and for it I praise thy name.

I give thee thanks for that fatherly goodness with which thou providest daily for my support; and for those various and innumerable blessings which thou dispensest to me, and which render my life comfortable.

I praise thee for those tender connexions thy providence has led me to form: and for the inestimable present thou hast made me in giving me *friends*.

Thanksgiving for God's care of his creatures.

I give thee thanks for the glorious hope I have of knowing one day, by happy and eternal experience, in what the blessedness of heaven consists.

I praise thee for this month which I am now so happily concluding. O God, thou hast done great things in my behalf; my soul rejoices in it; may I magnify thee for ever and ever!



SEPTEMBER.



SEPTEMBER I.

A HYMN TO THE PRAISE OF THE MOST HIGH.

SING unto the Lord with holy rapture; sing a new song unto our God! The Lord is great! Let us for ever celebrate this Being, who is infinitely good, infinitely wise, and from whose eyes nothing can be hid.

He has stretched out this starry heaven as a pavilion over our heads. There, encompassed with the splendour of innumerable suns, he has established his throne. There he dwells in light inaccessible to mortals.

O Lord, I am lost in this splendour; but thou, in thy infinite goodness, art to be found every where; thou art incessantly present with all thy creatures. Astonished at the wisdom of thy providence, and penetrated with admiration, I praise and exalt thy holy name.

I glorify thee, who governest the earth with paternal care: thou enlightenest it by the sun; thou waterest it by showers; and refreshest it by dews.

Thou coverest it with smiling verdure; thou crownest it with flowers; thou enrichest it with crops; and renewest its ornaments and its blessings year by year.

Thy care extends to all that exists; and the smallest creature is an object of thy kind attention. The young raven which, covered with snow, cries unto thee from the summit of a barren rock, is fed by thy hand.

Thou commandest the cooling stream to run from the bosom of the barren mountains: thou orderest the sun to invigorate the vines which adorn the hills, and ripen the fruits of our orchards; thou sendest the cooling breeze into our forests.

When thy sun begins to illuminate the world by the splendour of his fires, he calls forth the creatures to their labour; all is active in nature, till the time when the silence and darkness of the night bring on the desired repose.

A hymn to the praise of the Most High.

But, as soon as the day begins again to spring up, the choir of birds cause the air to resound with songs of gratitude and joy : it is then that all the nations of the world, and the zones under heaven, lift up one concert of praise unto Thee.

To thee they sing, Father of all beings ! Thou lovest all, thou loadest all with thy blessings ; thou hast designed all men for happiness, provided they themselves desire to be happy.

May thy name be celebrated in all the worlds which compose thy empire ! Let every voice unite in a universal song to that God whose goodness is unlimited, and whose wisdom is eternal !

SEPTEMBER I.*

THE OMNIPRESENCE OF GOD.

THOU art present every where, O Almighty God ! Yes, thou art here, thou art afar off, thou fillest the universe. Here grows a flower ; there shines a sun : thou art there ; thou art here also. Thou art in the breeze, and in the tempest : in the light, and in the darkness : in an atom, and in a world. Thou art present here in this flowery valley : thou attendest to my feeble accents ; and thou hearest, at the foot of thy throne, the sublime songs which accompany the seraph's lyre. O thou, who art the God of the seraphim ; thou art also my God ! Thou hearest us both ; thou hearest also the joyous notes with which yonder lark causes the air to resound ; thou hearest also the humming of that young bee that flutters round the rose. Omnipresent Being ! If thou hearest me, grant also my request : may I never forget that I am in thy sight : may I think and act as in thy presence : that when cited to the tribunal of my Judge, with the whole world of spirits, I may not be constrained to flee from the face of the Holy of Holies !

SEPTEMBER II.

THE BEAUTY AND VARIETY OF BUTTERFLIES.

LET us examine those beautiful creatures before they die ; probably this examination may be instructive both to our understanding and to our heart.

The first thing that merits our attention when viewing the inhabitants of the air is, the dress with which they are adorned. Some of them, however, have nothing particularly striking in this respect, their clothing is plain and simple. Others have a few ornaments on their wings ; and some have such a profusion that they are entirely covered with them. Let us reflect, for a few moments, on this last species. How beautiful are the shades which adorn it ! How pretty

Beauty and variety of butterflies.

the spots which set off other parts of its dress ! With what delicacy has nature penciled them ! But, however great my admiration may be, while I view this insect with the naked eye, it will be vastly increased when I view it through a microscope.

Who could have imagined that the wings of butterflies were garnished with feathers ? And yet nothing is more certain. What is commonly termed *dust* on their wings, is found to be feathers. Their structure and arrangement are as full of symmetry as their colours are of beauty. The central parts of these little feathers, which come in contact with the wings, are the strongest ; those, on the contrary, which form the external circumference, are much more delicate, and extremely fine. All these feathers have a quill at the end ; but the superior part is more transparent than the quill from which they proceed. If the wing be roughly handled, the more delicate part of the feathers will be destroyed. But, if what is called *the dust* be wiped away, nothing remains but a fine transparent skin, where may be readily distinguished the little holes in which the quill of each feather was inserted. This skin, from the manner of its formation, may be as easily distinguished from the rest of the wing, as fine gauze from the cloth on which it is sowed : it is more porous, more delicate, and seems as if embroidered with a needle : lastly, its contour is terminated with a fringe, the threads of which are extremely fine, and succeed each other in the most regular order.

What are our most elegant dresses, in comparison of that which nature has given this insect ? Our finest laces are but coarse cloth, compared to the delicate texture which covers the butterfly's wings ; and our finest thread appears, in presence of this, but a clumsy rope. Such is the extreme difference between the works of nature and art, when examined through a microscope. The former are finished in the utmost perfection imaginable : the latter, even the most beautiful in their kind, have no proper finish, and are coarsely made up. How beautiful does a fine piece of cambric appear to us ! Nothing more delicate than its threads : nothing more regular than its texture : nevertheless, these fine threads, viewed through a microscope, resemble hempen packthread ; and we should rather suppose the cloth to have been wrought by the hands of a basket-maker, than by an excellent weaver.

What is most astonishing in this brilliant insect is, that it comes from a worm, whose appearance is mean and vile. See how this butterfly spreads its sparkling wings to the sun, how it sports in his rays ! How it rejoices in its existence, and flutters from flower to flower ! Its splendid wings present us with the magnificence of the rainbow ! How beautiful is it now ! How much has it changed since the time in which, under the form of a reptile, it grovelled in the dust, always in danger of being trodden to death. Who has raised it above the earth ? Who has given it the faculty of living in the air ? Who has given it these beautifully coloured wings ? It was God. It was its Author and ours. In this insect he has shown us an emblem

of the transformation which awaits the righteous : a day will come, when, quitting this present form, they will cease to grovel on the earth : then, holy and glorious, they shall be raised above the clouds ; and, having nothing to obstruct their activity, they shall spring forward even beyond the stars themselves.

SEPTEMBER III.

THE GROWTH OF TREES.

EACH tree, however bushy it may be, receives its principal nourishment from its lower parts : and it is probable there is in it a circulation of juices similar to the circulation of blood in the human body. The extremities of the roots are a prodigious mass of spongy fibres and globules of air : but are always open to imbibe the juice which the earth affords them. This juice is at first nothing but water impregnated with earthy particles : then, by means of a sort of milky substance, which is peculiar to each tree, and which distinguishes it from others, the juice acquires a nutritive quality before it ascends into those parts of the tree which are above the surface of the earth. By the assistance of a microscope, wood, notwithstanding its hardness, is found to be nothing else than an assemblage of an infinite multitude of little hollow fibres.

Most of them, particularly in shrubs, ascend perpendicularly : but, to give more consistence to these fibres, there are, in certain trees, (particularly in those designed to be strong and hard,) tubes, which proceed horizontally from the centre to the circumference. Attracted by the heat of the sun, the juice ascends by degrees into the branches, and to all their external parts ; as the blood, proceeding from the heart, is carried by the arteries to the extremities of the animal body. When the juice has been sufficiently diffused through all the parts where it was necessary, what remains ascends by certain large vessels, placed between the outward and inward bark, just as the blood returns back through the veins. From this a growth results which is annually renewed, and this is what constitutes the size of the trees. To be convinced of this, we need only cut a branch transversely, and from this we shall be able to ascertain the age of the tree. While the trunk grows more and more in height, the roots grow downward in the same proportion. As to the exterior bark, it appears to be designed to serve, in some sort, as a garment to the tree ; to unite the component parts closely together ; and to preserve the tender, but essential parts, from external accidents, and from the intemperature of the air.

Thus has the wise Creator formed an admirable system of solid and fluid materials, in order to give life and growth to those trees which adorn our fields, and give shade to our flocks, our shepherds, and our cottages ; and which, when cut down, serve so many useful purposes

The growth of trees.

to many. In this we discover that wisdom which is never mistaken, which prescribes to nature laws, in certain respects, immutable; and which act uninterruptedly under the eye of Providence. A wisdom so profound, an art so marvellous; so many preparations and combinations for each tree, should excite us to venerate and admire his creating hand. The contemplation of this wisdom is a most delightful study, and must animate us to glorify that God, so great in his counsels and plans, and so wonderful in their execution. The more traces we discover of this wise Providence, the more we should be induced to place all our interests in his hands, who can never want means to turn all things to the advantage of his creatures. Finally, we should be encouraged to raise our affections to him, and supplicate him to enrich our souls with the gift of wisdom, and cause them to grow in grace.

May we, in our progress through life, resemble a flourishing tree; may we incessantly grow up in all righteousness! May we bring forth fruit suitable to our situation in life, and to that capacity which God has given us! May we also grow *inwardly*! May our souls be strengthened in holiness; established against all the storms of life; and deeply rooted in humility! May we never find the emblem of our state in an old tree, which, the longer it grows, the more it attaches itself to the earth. The nearer we come to the tomb, the more free should we be from all earthly attachments.

SEPTEMBER IV.

THE ANT-LION.

NO insect is more famous for its dexterity, than the *ant-lion*; there are fifteen species of them, but the *formicarius*, or ant-eater, is the most remarkable; it nearly resembles the *woodlouse*. It is provided with six feet; and its body, which is composed of many membranous rings, terminates in a point. Its head, flat and square, is armed with two moveable crooked horns, whose singular structure shows how admirable nature is, even in her smallest works.

This insect is the most subtle and dangerous enemy the ant has: the plans he forms to ensnare his prey, are very ingenious. He mines a portion of earth, in form of a funnel, and there waits in expectation of dragging to the bottom those ants which may chance to come to the precipice. In order to dig it, he traces in the earth a circular furrow, the circumference of which is exactly equal to the opening of the funnel; and the diameter of the funnel is always equal to the depth of his ditch. When he has fixed on the size of this opening, and traced the first furrow, he digs a second, concentric to the first, that he may throw out all the sand enclosed in the first circle. All these operations he performs with his head, which serves him in a place of a shovel; and its flat and square form renders it fit

The ant-lion

for this purpose. He also takes some sand with one of his fore-feet to throw it beyond the first furrow : and this work he repeats till he has got a certain depth in the sand. Sometimes in digging he meets with grains of sand, or dry bits of earth, too large to remain in his funnel. Of these he rids himself by a quick and well-timed motion of his head. If he finds larger substances, he endeavours to push them away with his back : and he is so assiduous in his labour, that he repeats it even six or seven times.

At last the ant-lion comes to enjoy the fruit of his labour. When his nets are once well laid, he is on the watch : motionless and concealed at the bottom of the ditch which he has digged, he waits for the prey that he is unable to pursue. Should any ant come on the brink of his precipice, it generally rolls down to the bottom, because the brink is made sloping ; the loose sand gives way under his feet, and the insect falls into the power of the enemy, who by the assistance of his horns, drags it under the sand, and feasts on it by sucking its blood. When nothing remains but the dead body, without blood or juices, he casts it out of his trench, and repairs any injury it may have sustained, and sets himself in ambush anew. He does not always succeed in seizing his prey the moment it falls in : it often escapes, and endeavours to climb up to the top of the funnel : but then the ant lion works with his head, and throws a shower of sand on his prey, part of which being cast beyond the ant, drags it down to the bottom of the trench.

All the actions of this little animal are so full of art, that we might long examine them without being wearied. The ant-lion employs himself in preparing his trench before he has even seen the animal which is his destined nourishment : nevertheless, his actions are so well regulated, that they become the most proper means of providing his subsistence. How could such a slow paced animal as this catch his prey so well as by digging in loose sand ; giving a slope to his trench, and overwhelming, with showers of sand, the insect that happens to fall into it ? All these actions have their fixed principles by which they are directed. His trench must be dug in the sand, without which it would not be fit to entrap his prey : he must, according to the structure of his body, work backwards, and use his horns like tongs, to cast the sand over the brink of his funnel. The instinct which directs this structure, shows us a First Cause, whose unerring wisdom has foreseen and ordered every thing necessary to the preservation and wellbeing of such an animal. The dexterity which he evidences, is not the fruit of experience and exercise ; it was born with him : we must then seek its origin in the wisdom, power, and goodness of that Supreme Being, who has proportioned the instinct of animals to the different degrees of their wants.

These reflections are a new motive to induce us to glorify him who is the Creator of all. He is the source of life, and he wishes to diffuse it every where. He has formed this insect so as to make its existence a blessing to itself. He has furnished it with the neces-

sary means for the preservation of life ; and by the instinct with which he has endued this animal (however limited in other respects) he has raised it to a degree of ingenuity approaching to reason ; and, in some respects, even surpassing it. And what has been his design in all this, but only to furnish us with opportunities of knowing him, even by means of the most despicable creatures ? To this purpose we should devote this piece of natural history. Every insect, however insignificant it may be, should cause us to raise our minds to Him who has created the small worm as well as the elephant, and who extends his care to the one as well as the other.

SEPTEMBER V.

CONFORMITY BETWEEN PLANTS AND ANIMALS.

IT is more difficult than we imagine, to find out the specific difference between plants and animals. It is by imperceptible degrees that nature descends from animate to inanimate beings : and exactly to distinguish these degrees, the penetration of an archangel would be requisite. But, we may remark, that notwithstanding all the differences which we observe between those two species of organized bodies, there still remains much resemblance.

The *seed* is to the plant, what the *egg* is to the animal. From the former springs the stalk, which was before concealed under its coats ; and this stalk makes an effort to raise itself out of the earth. In like manner, the animal enclosed in the egg, breaks the shell, in order to breathe the open air.

The *eye* or bud of the tree is the same in the vegetable that the *embryo* is in the animal kingdom. The eye does not pierce through the bark, till it be of a proper size ; and it continues attached to it, in order to derive nourishment from it, as well as from the fibres of the plant. The *embryo*, at the expiration of a determined time, comes from the womb, but could live but a short time, were it not to receive nourishment from its mother.

The plant *feeds* on nutritive juices, which are brought to it from without ; and which passing through various canals, are at last changed into its substance. The *nourishment* of the animal is effected nearly in the same way. It also receives nourishment from without : and after having passed through different vessels, it is changed into animal substance.

The *fecundation* of the germ takes place in the vegetable kingdom, when the dust of the *stamina* penetrates into the *pistils* : in like manner, fecundation takes place among animals, when the seminal liquor penetrates in the ovaries, or matrix.

The *multiplication* of plants is effected, not only by *seeds* and *grafting*, but by *slips*. Animals multiply in like manner, not only by

 Conformity between plants and animals.

laying eggs, and bringing forth their young alive, but also by *slips*, as in the case of the *polypus*.

The *diseases of plants* have either external or internal causes. It is the same with the diseases of animals.

Lastly, *death* is the common lot of the one, as well as of the other. When old age has indurated and obstructed the vessels, the circulation of the juices is stopped.

Plants and animals *dwell* in the same places :—the surface and interior parts of the earth ; the air, the sea, and the rivers, are filled with plants and animals. Both are extremely numerous : though plants are not so numerous as animals.

The *size* of the greatest tree is nearly equal to that of the largest animal.

Thus one might be tempted to believe that animals and plants are beings of the same class : seeing nature passes from one to the other by imperceptible gradations. It is very certain that some general and essential resemblances have been found between these two kingdoms : but the truly essential differences have not as yet been pointed out. And though some should be discovered which have not as yet been observed, it will ever remain certain, that nature has diversified her works by such fine shades, that the human mind can scarcely distinguish them. And who knows what discoveries may be reserved for our posterity ? Probably, plants may yet be found out, whose properties shall still more nearly resemble those of animal bodies. And, perhaps, animals may be found out, which more nearly resemble vegetables, than even the *polype* itself.

Let us make that use of the knowledge we have, for which all the truths of nature and revelation were designed. Let us use it to glorify God, and to strengthen ourselves in virtue. Let the great resemblance which is found between animals and plants, render us sensible of the power and wisdom of that Being, who has, in some sense, impressed the character of infinity on all his works. But, O man, learn to be humble. Thou also partakest of the nature of the plant, and of that of the animal. To Jesus alone thou art indebted for the privilege of being placed between brutes and angels. Endeavour, by godliness, to resemble those celestial spirits more and more. And, seeing it is granted thee to bear some resemblance to the Creator of all things, seek incessantly to be fitted for the kingdom of his glory. Think of what thou art ; and think of what thou mayest be.

“ How wonderful is that creature, who, like the brute, derives his nourishment from the bosom of the earth ; and, like the angel, raises his thoughts to heaven ! A creature, one half of which perishes as the brute perishes ; while the other half lives in immortal life ! A creature destined to holiness and perfection : to be free, and yet subject to God : to praise him for ever, and to be for ever happy ! ”

SEPTEMBER VI.

THE NATURE AND PROPERTIES OF SOUND.

ALL sounds are produced by means of the air : but in order to this, the air must be put in motion : not that the agitation of the air is the cause of sound ; for in that case, every wind would be attended with a noise. To produce sound, the air must be suddenly compressed, that it may afterward dilate and expand itself by its own elastic force. By this, a kind of tremulous or undulatory motion takes place, something like those waves and concentric circles which take place in the water when a stone is cast into it. But if this undulatory motion depended only on the particles of air which were compressed, the sound, in many cases, could never reach our ears. It is therefore necessary, that the sonorous body, after having made its impression on the contiguous air, should continue the impression from particle to particle, in a circular direction, to all parts.

By means of this propagation, the particles of air reach our ear ; and we have then the perception of sound. This propagation takes place with prodigious velocity : sound goes at the rate of 1142 feet in a second. This calculation, which has been verified by a multitude of experiments, may be very useful in many cases. It contributes to our safety, by informing us how far the lightning is from us ; and consequently, whether we are secure in the place we see the flash. We need only count the seconds, or the strokes of our pulse, between the lightning and the clap ; and we can immediately tell at what distance the thunder is. By the same means we may calculate the distance of places ; and that which separates two vessels. But it is very remarkable, that a weak sound is propagated with as much celerity as one that is strong. The agitation of the air, is, however, more strong when the sound is louder, because a greater mass of air is put in motion. The sound is louder when many particles of air are put in motion ; and the contrary when there are but few.

But, of what use would these observations be, which philosophers have made on the nature and properties of sound, if our bodies were not so formed that we might have the perception of *sound* ? Let us praise God, who has not only so disposed the air that sound may be propagated by means of its vibrations, but has also given us an organ, by which we are capable of perceiving those sonorous impressions. A thin elastic membrane, stretched on the bottom of the ear, as the skin is on the drum, receives the vibrations of the air ; and by this we have the power of distinguishing all sorts of sounds. Thus far our knowledge reaches. But, if we ask, how, when a word is pronounced, we receive the idea of that word, and not of a simple sound ; or how a tone can act upon our mind, and produce in it so many different ideas ? We are obliged, on all these points, to confess our ignorance. It is necessary that this, and every thing else, should convince us of the wisdom and goodness of the Creator. Were there

 Nature and properties of sound.

no sound, all men would be dumb ; and we should be as ignorant as infants who have not yet the use of speech. But by means of sound, each creature may make known its wants, or express its happiness.

But man has great advantages over other animals. He can express the sentiments of his heart ; and excite all the 'passions by certain tones of his voice. God has not only endued us with a power to distinguish sounds by the organ of hearing, but has furnished us with means to preserve this precious faculty. When one ear is injured, the other can supply its lack of service. And he whose hearing is weak, may improve it by the *acoustic horn*. Even when the outer auditory pipe is injured, the internal one, which terminates in the mouth, may remain unhurt. Farther still ; the Creator has even condescended to make this minister to our pleasures : a multitude of musical instruments may delight and charm us ; and we are able to distinguish their different tones : for the auditory nerve transmits, with the utmost fidelity, the tones of an infinite number of sonorous bodies. With what sentiments of gratitude to our beneficent Creator should we be penetrated, when we consider what his kindness has done for us ! May we never forget our obligations ! May our thanksgiving reach as far as sound extends. May the universe re-echo his praises ; and heaven and earth hear the great things which God has done for man !

 SEPTEMBER VII.

MYSTERIES OF NATURE.

WHEN men attempt to investigate things, and to penetrate into the causes of those effects which they have seen, they are obliged to acknowledge how weak and limited their understandings are. The knowledge we have of nature, of which we are sometimes so vain, scarcely extends any farther than to a superficial acquaintance with the effects of a few things which we have constantly before our eyes, and which we are able, in a certain measure, to apply to our advantage. But, as to knowing the causes of these effects, and how they operate, is to us an impenetrable mystery. There are even a thousand effects in nature, which are concealed from us : and those which we can in some measure explain, have a certain obscurity which obliges us to remember that we are but men. There are many phenomena, the immediate causes of which we know not. Several are doubtful ; and there are very few that we know with certainty.

We hear the *wind* blow ; we experience its great and various effects ; but we do not exactly know what produces it, what increases it, and what abates its violence.

From a small *seed* we see a *plant* spring with stalks and ears ; and we know not how this is effected. As little can we comprehend how

Mysteries of nature.

a plant can spring from a small kernel, which increases to a large tree, in the branches of which the fowls of the air may build their nests : which clothes itself with leaves and blossoms, to shade and please us, and brings forth fruit for our nourishment ; and affords us wood for many necessary uses.—All the *aliments* we use, which are so very different in their nature, are transformed within us by an incomprehensible mechanism ; and assimilated to our blood, and to our flesh.—We see the wonderful effects of the *loadstone* ; and we believe there must be a certain matter which operates in it : but whether it acts by an attracting force peculiar to itself : or whether the magnetic influence circulate about the stone ; or whether it form a sort of vortex, we cannot determine.

We feel the *cold* ; but no naturalist has been as yet able to discover how it is produced.—We know more of *thunder* and *lightning* than our ancestors did ; but what the nature of that electric matter is, which in thunder storms is so terrible, no man knows.—We know that the *eye* sees the images which are painted on the *retina* ; that the *ear* has the perception of sound by the vibrations of the air ; but what are perceptions, and how are they formed ?—We have a conviction of the existence of the *soul* in the body ; but who can explain the union of the body and soul, and their mutual influence on each other ? The effects of *fire* and *air* are continually before us : but, who can tell what their nature is, what are their elementary parts, and how they produce their different effects ? In a word, in respect to most things we have no fixed and incontestable principles, and are reduced to take refuge in *probability* and *conjecture*. What are all the hypotheses of philosophers, but tacit confessions of their limited knowledge ? At every step, nature presents us with wonders which confound us : and, notwithstanding all our discoveries, a thousand things remain which we cannot comprehend. It happens, sometimes, it is true, that we can give happy explications of certain phenomena ; but the principles, the first springs, their nature, and mode of operation, are certainly far exalted above the sphere of our understanding.

The *mysteries of nature* give us daily lessons of wisdom on the subject of the *mysteries of revelation*. In nature, God has placed within our reach the *means* by which we may go through life comfortably, though he has placed their causes out of our sight. It is the same in the kingdom of grace : he affords us *means* to arrive at a spiritual and eternal life ; although the manner in which they operate is concealed from us. Is there a person who would refuse to *eat* and *drink*, till he could comprehend how food *increases strength* and *preserves life* ? Is there a man to be found, who would neither *sow* nor *plant*, till he could comprehend the nature of *vegetation* ? Is there any one who would refuse to make use of *wool*, till he could tell how it is *formed* ? Man does not push his extravagance so far. On the contrary, he observes the productions of nature ; experience

Mysteries of nature.

tells him their utility, and he enjoys them with gratitude to his Maker. But, why do not men conduct themselves so in respect to the *mysteries of grace*? Men dispute about the nature of the means of salvation; their efficacy; and their mode of operation; and they neglect that saving use of them which God intended. O why are we not as wise in things spiritual as in things temporal! Instead of giving way to vain and useless speculations, let us avail ourselves of those means of grace which God affords us, and make a faithful use of them! For this end they were granted us, and not for subjects of curious speculation, concerning their nature and manner of operation. If we find things which we cannot fathom or comprehend, let us receive them with humility, and acknowledge the weakness of our understanding. The advantage which we shall derive from a faithful use of them, will be sufficient to convince us that they are the work of a Being infinitely wise, and infinitely beneficent.

God forbid that we should be so presumptuous, as to flatter ourselves with the hope of being able to fathom either the mysteries of the kingdom of nature, or those of the empire of grace! Let us not dare to criticise, or blame, what we cannot comprehend. Let us rather acknowledge the weakness of our understanding; and the infinite greatness of God. Then each mystery will excite us to adore that infinite Being, whose works are marvellous, and whose ways are past finding out!

SEPTEMBER VIII.

THE EYES OF ANIMALS.

THE bare consideration of the *eyes* of different kinds of animals, is sufficient to convince any person of the wisdom with which God has formed the bodies of his creatures. He has not given the sense of sight to each in the same way: but has diversified the organs of it so as to adapt them in the best way to different kinds of animals. Deep reflection on this subject will afford us one of the noblest pleasures of which the human mind is capable.

The eyes of most animals appear round: but in this spherical figure there is great variety. Their situation in the head, near the brain, the most sensible part of the system, is subject to many differences also. Man, and most quadrupeds, have *six* muscles attached to each eye, by which they can move it from side to side. The position of the eye is such, that they see straight before them; and describe nearly a semicircle. But even in this there is a diversity. *Horses, oxen, sheep, swine*, and most quadrupeds, have a *seventh* muscle, to suspend and support the eye-ball, which is highly necessary for them, because their head and eyes hang towards the earth, while seeking their food.

The eyes of *frogs* differ from ours; as they can cover theirs with a membrane, which is transparent, though of a sufficiently close tex-

Eyes of animals.

ture. This defends their eyes, and guards them from those dangers to which animals, in their way of life, are exposed, by living sometimes on the land, and sometimes under water. *Flies*, *gnats*, and similar insects, have more perfect sight than other creatures. They have nearly as many eyes as they have apertures in their cornea: whereas other animals, which have but two eyes, are obliged to turn them by means of muscles, towards the objects: *flies* can see them distinctly on all sides, without interruption, and without the trouble of turning their eyes; because one or other of these little eyes is, from its nature, always directed towards some one of the objects which surround them. *Fish*, which live in a denser element than ours, could see nothing, and by the strong refraction of the rays of light would be blinded, though their eyes are continually open and well formed, were not the chrystalline humour almost spherical, in order the better to collect the rays of light. They have no eyelids, and they cannot draw back their eyes; but their cornea, which is almost as hard as a *horn*, preserves them from all danger. Formerly, the *mole* was supposed to be blind, but it is certain that it has little black eyes, about as large as the head of a pin. As this animal is almost always under ground, it was necessary that his eyes should be very small, sunk in the head, and covered with hair.

We know that the eyes of snails are placed on the tops of their two long horns, and that they can draw them into their heads, or push them out, to discover distant objects. In those animals which can neither move their heads nor eyes, this defect is compensated, either by the number of eyes, or by some other means. The *spider* has four, six, and sometimes eight eyes; all placed in front of a round head, without any neck. They are clear and transparent, like a bracelet garnished with diamonds. According to the way and life, and different wants of several kinds of spiders, their eyes are distributed differently in their heads, that they may see on all sides; and without moving their head, may at once discover the flies destined to be their food.

The *cameleon* (a species of lizard) has the singular property of moving one of its eyes while the other stands still: of turning one eye up, and the other down; and of seeing what happens both before and behind it at the same time. Some *birds* have the same power: so also have *hares* and *rabbits*, whose eyes are very convex: this preserves them from many dangers, and enables them to discover their food with less difficulty.

All these examples (and they might be easily multiplied) show very plainly the tender care of the Creator for the preservation of the organs of the most necessary senses. He has been pleased to communicate the blessing of sight to his creatures in a variety of ways; and we cannot but be struck with astonishment, when we consider the admirable art observed throughout; and the precautions which he has taken to keep his creatures in possession of this valuable gift; and to preserve it from the dangers to which it might be

 Eyes of animals.

exposed. All parts of the bodies of animals are disposed in the most exact proportion, and in the most suitable manner to their different necessities ; and the accomplishment of the ends for which they were designed. The situation of the eyes ; their arrangement, their number, and their form, could not have been otherwise in any animal without great inconvenience. For, it was not merely for ornament, but for the advantage of animals, that the Creator has so varied the structure and position of their eyes. And, undoubtedly, one of his designs was, that we might learn to acknowledge and celebrate his wisdom in all things. Let the foregoing reflections be applied in this way : and when we seriously consider the wise ends which God has proposed in all his works, we shall be excited to magnify his power and goodness.

 SEPTEMBER IX.

FISH.

WHO would have ever thought that there were such creatures as *fish*, if he had not seen them ? If a naturalist only knew those animals which walk and breathe on the land like the *rein-deer*, and were told that there were a species of creatures in the water, so formed, that they could live, move, propagate, and fulfil all animal functions with facility and pleasure in that element ; would he not treat the information as a vision ; and conclude, from what happens to our bodies, when immersed in water, that it would be impossible for any creature to live in that element ?

The way in which fish live ; their make, motion, and the propagation of their species, are all very wonderful, and afford fresh proofs of the omnipotence and infinite wisdom of our Sovereign Creator. That these creatures might be able to live in the water, it was necessary that their bodies should be differently constructed, as to their essential parts, from those of terrestrial animals : and we accordingly find this to be the case, on an examination of the external and internal structure of the bodies of fish. Why has the Creator given to most fish a tapering body, slender, flat on the sides, and always pointed at the head, but that they might the more easily swim, and cut their way through the water ? Why are they covered with scales of a horny substance, but that their bodies might sustain no injury by the pressure of the waters ? Why are many fish, especially those who are destitute of scales, or which have only very soft ones, enveloped in a fat oily covering, but to preserve their tender substance from injury, and to keep them in a due degree of warmth ? Why have they such cartilaginous and porous bones, but that their bodies may be more light and flexible ? Why have all fish their eyes sunk into their heads, and why is their crystalline humour spherical, but that they may not be so easily injured, and that the rays of light

Fish.

may be better concentrated? It is evident, that in the arrangement of all these parts, the Creator has had respect to the mode of life and destination of these animals.

But there are other circumstances equally admirable in the structure of fish. The *fins* are almost their only limbs, yet they are sufficient for all their motions. By means of the *tail fins* they move forward. The *back fin* directs the motion of their body; and they raise themselves by the *breast fin*, while the *belly fin* serves to hold them in equilibrio. The *gills* are their organs of respiration; they are situated behind the head: there are four on each side, the uppermost of which are the largest. They take in water continually by their mouths, which is their inspiration; they throw it out at their gills, which is their expiration. The blood which proceeds from the heart, and which is distributed through the veins of the gills, does not return through the lungs to the heart, as in terrestrial animals, but is directly dispersed through all parts of the body. One of the organs most necessary to fish in swimming, is the *air-bladder*, which is included in their belly, and communicates with their stomach. By means of this bladder they can make their bodies lighter or heavier, as they please. As soon as this vessel is inflated they become lighter, ascend, and can swim near the surface of the water: but when it is contracted, and the air compressed, their body becomes heavier, and they sink in the water. When this bladder is pricked with a pin, the fish falls immediately to the bottom, and cannot raise itself up to the surface again.

What further merits our attention is, the prodigious number of fish; as also the great variety in their shape and size. In *Germany* alone there are more than 400 different kinds of fish. And who can count the number in each species? Their external form is also greatly varied. Among fish we find the very largest, as also the smallest of animals. Some are long, and as fine as a thread: others are short and broad: others are flat, cylindrical, triangular, round, &c. There are some which are armed with a horn: others with a species of sword: and others with a kind of saw. Some have nostrils through which they forcibly eject the superfluous water they have swallowed.

Which are we most to admire in all this? The power and wisdom of the Creator in the formation and preservation of these animals, or his goodness in giving them for our use? Every thing must lead the attentive observer of the works of God to magnify his name. What magnificence does God manifest in all the elements, and in all animals, whether they inhabit the air, the earth, or the sea? In the whale, whose back is an island in the midst of the waters; and in the gold fish, which glitters in the rivulets. And in all this how great is his goodness towards us! Of how many nutritive dishes should we be deprived, if those extensive plains, on which neither trees nor fruit grow, were not peopled with creatures as prolific as they are delicious: and which amply satisfy our wants?

SEPTEMBER X.

THE PROPAGATION OF ANIMALS.

FORMERLY it was supposed that insects, vermin, and even some quadrupeds, were generated from corruption, without the interposition of animals of the same species. But this hypothesis, which is manifestly opposite to reason, is contradicted also by the most decisive experiments. It is now well known, that all animals can produce their like; and that this propagation is generally effected in two ways: first, by laying eggs; secondly, by bringing forth the young alive. All the class of *mammalia*, or animals which give milk, are *viviparous*. All birds are *oviparous*: but their eggs must be impregnated by the male before they are capable of producing young. In most animals, it is essentially necessary that the female should receive the seminal fluid by junction with the male. Fish alone seem to be an exception to this rule. That they couple, has not yet been discovered: the males cast their liquor, which is either swallowed by the female, or falling on the eggs which she has deposited in the water, impregnates them.

Fish are the most prolific of all animals. When we think of so many millions of herrings, which are caught annually, we may be surprised that any should still remain. But the multiplication of fish is prodigious. It has been found, for instance, that the *pike* lays, 300,000 eggs; the *carp* above 200,000, and *mackarel* near half a million! The *eel* is *viviparous*. Most *amphibious* animals couple like others. Some, however, cast the seminal liquor like fish. Some are *viviparous*, others are *oviparous*; but the latter do not hatch their eggs, they leave them to the warmth of the air, or to that of the water; and sometimes they deposit them in heaps of dung.

Worms are *viviparous*, and *oviparous*. In their generation there are many singular circumstances. The greater part, if not the whole, are *hermaphrodites*; and they can impregnate themselves, or mutually impregnate each other.

The distinction of sex is very evident in most insects: there are some, however, that have no sex; and others in which the two sexes are united in the same animal. Insects are in general *oviparous*; but there are some who bring forth their young alive. The eggs of the former are hatched by the warmth of the air: but in this class of animals a singular circumstance takes place, which at first sight might indicate that the male and female never copulate. The insect called the *leaflouse*, or *blight*, is commonly *viviparous*. An insect of this class, taken at the moment of its birth, separated from all of the same species, and shut up in the most perfect solitude, will, nevertheless, produce young ones. This takes place as follows. In the spring, and during the summer, the females of this species bring forth their young without previous union with the male. Then they are *viviparous*. A single one may produce a *hundred* little ones in less than

 Propagation of animals.

three weeks. All that is born in this season are *females*; the *males* come about *autumn*. Then they couple, and the females lay eggs, and thus cease to be viviparous. These eggs are hatched in the spring. Thus one junction of male and female serves, at least for ten consecutive generations, the individuals of which are impregnated with their mother's eggs!

When we reflect on this variety in the propagation of animals, we cannot but be struck with the wonders of the power and wisdom of God. The instinct which induces the two sexes to unite is admirable. This natural propensity is not produced by any external circumstance. It is manifested with as much energy in animals which live alone, as in those which are gregarious. The wisdom of the Creator is further evident in this, that generally the females have their set time of bringing forth their young. *Wolves* and *foxes* go to rutting in *January*; *horses* in *summer*: *stags* in *September* and *October*. *Insects* couple in *autumn*; *birds*, and most *fish* in *spring*; the *roe-buck* and *doe*, in *September*; *cats* in *January*, *May*, and *September*. If the coupling of animals did not take place at fixed times, the generations would be confounded, and the race itself would be injured.

Is it not astonishing, that while they enjoy their natural liberty, they do not mix in such a manner as to confound the different species, or cause the original *genus* to become extinct! Who can help admiring how exactly the organs of generation, in animals of the same species, are suited to each other, and not at all adapted to creatures of a different order; but exactly calculated to accomplish that multitude of particular ends, which all unite in one grand general purpose, viz. the constant preservation and multiplication of every species of animals.

How blind must those men be, who, in all this, will not acknowledge the wisdom of God: but ascribe the whole to chance? Hoping that the reader does not belong to this class of men, he is invited to contemplate the Divine wisdom, so evidently manifested in the propagation of animals. These meditations may not only be pleasing in themselves; but also furnish us with motives to love that God who, for the good of the world, and the benefit of man, has provided, with so much wisdom, for the preservation and multiplication of animals.

 SEPTEMBER XI.

THE INFLUENCE OF THE MOON ON THE HUMAN BODY.

FORMERLY certain influences were ascribed to the moon which were well calculated to nourish superstition, and excite groundless fears. The gardener would not plant till he had made observations on the moon. The husbandman deferred sowing till he was well assured of the happy influence of this planet. Sick people attended

 Influence of the moon on the human body.

with the most scrupulous exactness, to the variations of the moon; and physicians themselves paid attention to these in all their prescriptions. These prejudices, however, have lost ground by degrees; at least it is certain, that the empire of superstition, relative to the influences of the moon, is not so universal as it was formerly. This is one of the many advantages the present age has over the past: an advantage too little considered, and which merits our warmest gratitude to God. It is the duty of every person to render this still more extensive; and to labour, as much as possible, to extirpate ancient superstitions.

With regard to the effects of the moon upon our bodies, it is best to preserve a just medium; for, as it would be unreasonable to attribute to that planet too great an influence over the human body, it would be no less rash to deny it any. It must be allowed that the moon occasions great changes in the air; and consequently, may produce several alterations in the state of our bodies. The moon may cause considerable emotions and alterations in the superior parts of the atmosphere; so as to occasion earthquakes, winds, heat, cold, exhalations, mists, &c. and, on this account, the health of our bodies may greatly depend on the influence of the moon. It is observed, that people who have certain infirmities, feel acerbations, and more acute pains at the *change* and *full* of the moon. And this is not to be wondered at; for it is true, that cold and damp air, foggy and stormy weather, have a different effect on our health, from a warm, dry, pure, and serene air; the moon must have considerable influence over the animal economy, seeing she produces such alterations in the temperature of the air. The action of this planet on the human body, is founded on a principle that cannot be contested: it is this; That our health depends, in a great measure, on the state of the weather, and the constitution of the air we breathe: and no person can deny, that the moon may cause many derangements in the atmosphere. Possibly there may be in the human body a flux and reflux occasioned by the moon, analogous to that which she produces in the sea. Why do most periodical diseases return at the end of four weeks, rather than at a longer or shorter period, if they have no relation to the influences of the moon on the human body?

In general, it is a principle which we ought to admit, to the glory of our wise Creator, that in all natural things, there are certain relations which influence the animal economy in a variety of ways. There are, doubtless, various wonders in the atmosphere which are still unknown to us, and which occasion many important revolutions in nature. Who knows but many phenomena of the corporeal world, which we either think nothing of, or attribute to some other cause, depend on the moon? Possibly the light with which she favours us during the night, is one of the least of the purposes for which God formed this planet. Perhaps her being placed near the earth, was to produce on it certain effects which the other planets could not do, because of their distance. At least it is certain, that every thing in our

system stands in some kind of relation to our globe. And it is this particularly which shows the world to be such a master-piece of the Divine wisdom. The beauty of the universe consists in the diversity and harmony of its component parts ; in the number, nature, and variety of their effects ; and in the *sum* of good which is the result of all these combinations.

How then can the influence of the moon and stars create superstitious ideas and fears in our hearts ? If we believe that God has planned the whole ; that he has established the connexions which subsist between all the globes, how can we indulge vain terrors, which are so contrary to the ideas we should form of the Divine wisdom ? If we be truly persuaded that this Supreme Being governs all things with infinite wisdom and goodness, is it not natural that we should trust in him, and confide with tranquillity and joy in his good providence ?

SEPTEMBER XII.

THE IGNIS FATUUS.

THE *ignis fatuus*, vulgarly called *will-with-the-wisp*, or *jack-a-lan-thern*, is a little flame which skips about in the air, a few feet from the ground : and which appears to go hither and thither at random. This fire seems to disappear and go out suddenly ; probably when brakes and bushes hide it from the sight ; but it is soon rekindled in other places. Such fires are seldom to be seen in cold countries : and we are assured, that in winter they are only to be seen in marshy places. In *Spain*, *Italy*, and other warm countries, they are met with in all the seasons ; and are neither extinguished by wind nor rain. They are seen most frequently where there are putrified plants, and animal substances : as in churchyards, common sewers, and in fat and marshy ground.

Too few experiments have been made on these ærial fires to determine with any precision on their nature. But the places where they are seen, may lead us to very probable conjectures. For as they almost always appear in marshy countries, it is natural to suppose that they are ignited sulphureous exhalations. It is well known that dead carcasses, and rotten plants, sometimes emit light. Probably the *ignis fatuus* is nothing else than exhalations, condensed by the cold of the night : or is owing to a weak kind of electricity, produced by the inward motion of the exhalations, which float in the air. Horses, dogs, cats, and even men, may become electric, and emit sparks, when they are rubbed, or put in motion in a particular way. May not the same thing happen to certain places of the earth ? It may so happen that a field, through particular circumstances, may be electrified in some parts ; and then it is not astonishing that it should become luminous. The air itself may produce the *ignis fatuus*, when it is electrified to a degree.

The ignis fatuus.

If the manner in which these ærial fires are produced be still uncertain, it is at least indisputable that they are effects of natural causes ; and consequently, we need not have recourse to superstition. Superstitious people look on these flames with so much terror, that few have courage enough to approach them. Many believe them to be departed souls, or malignant spirits which wander about, and which take pleasure in leading travellers astray during the night. What may have given rise to this superstitious notion is, that the *ignis fatuus* follows all the motions of the air ; and thus it seems to fly from those who pursue ; and, on the contrary, follows those who run from, and wish to escape it ; and sometimes sticks to coaches, &c. which drive swiftly. But, the reason of these phenomena is very evident, for the person who runs after one of these fires, drives the air before him and consequently the fire, which follows all its motions ; whereas the person who flies, leaves an empty space, which the surrounding air incessantly rushing in to supply, a current is formed which has its direction from the fire to the person who runs, and this necessarily leads on this light flame. This also is the reason why the fire stops when the person ceases to run ; because the motion of the air then ceases.

How many persons torment themselves with vain alarms, which have no other ground than a disordered imagination ! We might save ourselves from many fears if we would take a little more trouble to examine the objects of our terror, and search out their natural causes. Nearly the same things happen to us in a moral sense. With what ardour do men pursue the goods of fortune, without examining whether they deserve this anxiety, or can afford us the happiness we expect from them.

Most ambitious and covetous people are as unsuccessful in the pursuit of honours and riches as *Robert Flood*, who used to run after the *ignis fatuus* without ever being able to catch it. What do we gain in the end by the continual efforts we make to acquire those goods, which, both in their nature and duration, so exactly resemble the *ignis fatuus* ? Commonly terrestrial good flies away from him who pursues it, and falls to the lot of those who wish to avoid it.

SEPTEMBER XIII.

THE MINERAL KINGDOM.

IN order to procure wholesome and convenient dwellings, men require many materials. If these materials had been scattered over the face of the earth, it must have been covered with them ; and no room would have been left for animals and plants. Our earth is happily free from such encumbrance. Its surface has been left open, and it may be cultivated, and traversed by its inhabitants, without any hinderance. Metals, stones, and a hundred other matters, which we

The mineral kingdom.

continually use, are shut up under our feet in immense cellars, where we find them whenever we want them. These matters are not hidden in the centre of the earth, nor at an inaccessible depth, but are purposely brought near the surface, and placed under a vault, which is at once thick enough to produce sufficient nourishment for men and animals, and thin enough to be easily dug through, when we need to go down and bring up some of the innumerable articles deposited in this vast magazine.

All the substances in the *mineral kingdom* may be divided into *four classes*; each of which has its distinguishing characteristic. The *first* includes *earths*. This name is given to those bodies which cannot be dissolved either by *fire*, or in *oil*, which are not malleable, and which stand the action of fire without losing any of their substance. To this class belong, not only the simple earths, but also *stones*, which are composed of these earths. There are two kinds of stones, the *precious* and the *common*. The latter are the most numerous, and present themselves to us in masses, different in form, size, colour, and hardness, according to the earths, sulphurs, &c. of which they are composed. Precious stones are also in great variety. Some are perfectly transparent, and appear to be the most simple. Others are more or less opaque, according as they are composed more or less of heterogeneous particles.

Salts form the *second* class in the mineral kingdom. They include those bodies which are soluble in water, and which leave a relish on the tongue. Some melt in the fire; and others remain in it unaltered. They are divided into *acids*, which are sharp and sour; and *alkalies*, which leave on the tongue a bitter, burning, and lixivial taste. These have the property of changing all *blue* vegetable liquors into *green*. From an exact and proper mixture of these two salts with each other, *neutral salts* are produced. Among these the *common*, or *kitchen salt* is reckoned, which is either extracted from the earth, or prepared with sea-water; or obtained by the evaporation of brackish fountain water, in large caldrons over a fire. All these salts are one of the principal causes of vegetation. They also serve probably to unite and strengthen the parts of plants, as well as of other compound bodies. Finally, they produce fermentations; the effects of which are very different and numerous.

The *third* class of the mineral kingdom, comprehends *inflammable bodies*; to which the general name of *bitumens* has been given. They burn in the fire; and when they are pure they dissolve in oils, but never in water. These bodies are distinguished from other minerals, by containing more of that inflammable quality which renders those substances combustible, where they are found in sufficient quantity. There is less or more of this substance in almost all bodies.

The *fourth* class of the mineral kingdom contains *metals*. These are bodies much heavier than the others; they become fluid in the fire, but resume their solidity when cold. They are bright and malleable. Among metals some are found which, when melted, suffer no

The mineral kingdom.

diminution of weight, nor any other sensible alteration ; these are termed *perfect metals*. Of this sort there are three, *gold*, *silver*, and *platina*. The other metals which are called *imperfect*, are destroyed more or less speedily, by the action of the fire, and commonly change into a calx. One of them, *lead*, has the property of being converted, into glass ; and of vitrifying all the other metals, gold and silver excepted. The *imperfect* metals are *five* in number, viz. *quicksilver*, *lead*, *copper*, *iron*, and *tin*. But there are other bodies which are distinguished from metals, not being ductile, nor malleable ; these are called *semi-metals*, and are *nine* in number, viz. *arsenic*, *molybdena*, *tungstein*, *manganese*, *nickel*, *cobalt*, *bismuth*, *antimony*, and *zinc*. It is necessary, however, to remark, that to the above list of *nine*, lately are added four new semi-metals, *uranite*, *sylvanite*, *titanite*, and *menachanite*.

The whole mineral kingdom is the workshop of nature, where she labours in secret for the benefit of the world. No naturalist has yet been able to surprise her in any of her operations, and steal from her the art with which she assembles, prepares, and composes her salts, earths, bitumens, and metals. If we cannot guess how nature employs the substances which are daily produced ; it is not less difficult to discover how the parts associate, combine, attenuate, and finally form the different bodies which the mineral kingdom presents us. We have but a very imperfect knowledge of the surface of the earth ; and we are still less acquainted with the interior parts. The deepest mines are not more than about 630 fathoms, which is not the six thousandth part of the earth's semi-diameter. This alone is sufficient to show how impossible it is to have an exact and perfect knowledge of nature, and the formation of the different substances in the mineral kingdom. Happily, in the use which we make of the gifts of nature, it is of little consequence whether we exactly know their origin and first principles or not. It is enough that we have the knowledge necessary to apply them to our use. We know enough to glorify our Creator ; seeing we are convinced that there is not a point, either on or under the earth's surface, where his power, wisdom, and goodness, are not particularly manifested.

SEPTEMBER XIV

SOME OF THE PRINCIPAL EXOTIC PLANTS.

WE do not pay sufficient attention to the gifts of God, and particularly to those which come to us from distant countries, and which are now become so necessary. If we consider what trouble it costs, what *wheels*, so to speak, must be put in motion in the great machine of the world, and how much strength and industry it requires to provide us a little *sugar* or *cinnamon* ; we should not receive the gifts of God with such indifference as we generally do ; but, on the contrary,

Some of the principal exotic plants.

we should look up to the Supreme Being with gratitude, who uses so many means to convey his blessings to us. At present let us consider those foreign productions, which are become necessities of life, and which would be so difficult for us to dispense with. Perhaps some useful reflections may arise from this; and we may think, at least, with concern of our ill-fated brethren, the miserable *slaves*, whose severe labour procures so many luxuries for us.

Sugar is properly the salt which is found in the juices or marrow, of a certain reed, which is cultivated principally in *Brazil*, and in the neighbouring islands; but which is also found in abundance in the *East Indies*, and in some of the *African islands*. The preparation of sugar does not require much art; but it is extremely laborious, and it is *slaves* alone who are generally employed in this painful business. When the canes are ripe, they are cut and carried to the mill to be bruised, that the juice may be extracted from them. The juice is first boiled, without which it would ferment and grow sour. While it is boiling, they scum it to take off any dirt; and this boiling is repeated four times, in four different caldrons. To purify and clarify it still more, they throw into it a strong lye of wood ashes, and quicklime: finally, they cast it into moulds that it may coagulate and dry.

Tea is only the leaf of a shrub which grows in *Japan*, *China*, and other Asiatic countries. These leaves are gathered three or four times during the spring. Those of the first gathering are the finest and most delicate. This is what is termed *imperial tea*; but it never comes into Europe. That which the Dutch sell under this name, is only of the *second* gathering.

Coffee is the kernel of a fruit similar to a cherry. The tree which bears it is a native of *Arabia*; but it has been transplanted into many warm countries. Next to *Arabia*, the best place for its cultivation is the island of *Martinique*. The kernel which is found in the midst of the fruit, we call *berry*; when fresh it is yellowish, or gray, or of a pale green: and it preserves this colour pretty well when dry. The fruit is spread on mats, that it may be dried in the sun; and it is afterward bruised with rollers to separate the kernels from the fruit; hence it is that each berry, or kernel, is divided into two. The kernels are once more dried in the sun before they are put on shipboard.

Cloves are the buds, or dried blossoms of a tree, which formerly grew without culture in the *Molucca islands*; but the Dutch have transplanted it to *Amboyna*. This tree is the form and size of the laurel. Its trunk is covered with bark like that of the olive. White flowers grow in bunches at the end of the branches, which have the appearance of *nails*. The buds are at first of a pale green, afterward they become yellow, then red, and lastly of a black brown, such as we see them. They have a more penetrating and aromatic smell than the *mother clove*, a name which distinguishes the dry fruit of the tree.

 Some of the principal exotic plants.

Cinnamon is the second, or inner bark, of a species of bay-tree, and which at present grows almost no where but in the island of *Ceylon*. The root of the cinnamon-tree is divided into many branches, and covered externally with a grayish bark, but with a red bark within. The leaf would bear a very near resemblance to that of the laurel, were it a little shorter and more pointed. The blossoms are white and small, of a very agreeable smell, like that of the *may-flower*. When the tree is some years old, they separate the two barks: the outer bark being good for nothing, is thrown away. The inward bark is dried in the sun, and rolls itself up about the size of a finger, and this is what we call *cinnamon*.

Nutmegs and *mace* are the produce of a tree which grows in the *Molucca islands*. The nut is covered with three rinds; the first falls off itself when the nut is ripe; the second then appears, which is very thin and fine: it is taken off the fresh nut with a great deal of care, and exposed to the sun to dry. This is called *macis* in the *Molucca islands*; and is here improperly termed the *nutmeg-blossom*. The third bark is the inner coat of the nutmeg. The nut is taken out of its shell, and put in lime-water, in which it remains for some days; by which time it is well prepared, and fit to be sent abroad.

Cotton grows in most parts of *Asia*, *Africa*, and *America*. It is the fruit of a sort of pod, which opens when ripe, and presents a wad or lump of down extremely white. This is called *cotton*. When this wad swells with the heat, it becomes as large as an apple. With a little mill they cause the seed to fall on one side, and the cotton on the other. It is afterward spun for all kinds of work.

Olive oil is the expressed juice of the fruit of the olive-tree: whole forests of which may be seen in *France*, *Spain*, *Portugal*, and *Italy*. The inhabitants of the provinces where these trees abound, make use of the oil instead of butter, as they have very few *cows*; the extreme warmth of the earth preventing the growth of grass.

Pepper is the fruit of a shrub, the stem of which requires a prop to support it. The wood of it is knotty, like the vine, to which it bears a near resemblance. Its leaves, which have a very strong smell, are oval, and terminate in a point. In the middle, and at the extremity of the branches, there are white flowers, whence the fruit grows in bunches similar to gooseberries; each fruit bears twenty or thirty pepper-corns.

It is not a little satisfaction to a reflecting mind, to think of the great number of aliments designed, not only to supply our necessities, but also to please our palate. Let us consider those blessings which the Divine bounty grants us in such abundance. Every country contributes to furnish us with the necessaries and conveniencies of life. The inhabitants of the most remote climates labour for us: the miserable slave, who deserves as well as we to eat in peace and quietness the fruit of his labours, prepares, at the expense of his sweat and ease, those luxuries which we consume with so much pro-

Some of the principal exotic plants.

fusion. If we do not think of our heavenly Benefactor, let us think at least of the instruments which he uses to procure us a part of our subsistence. But, how can we forget that God, who furnishes our table from all parts, and shows his goodness towards us from every quarter of the globe ?

SEPTEMBER XV.

REFLECTIONS ON ONE'S SELF.

I LIVE : my blood circulates (without any concern of mine) through arteries and veins, arranged and protected with wonderful art. I can enjoy the sweets of *sleep* : and in a state in which I am ignorant of myself, in this body, which appears without motion or life, my soul still exists ! I *awake* ; my senses resume their functions, and my soul receives clearer and more lively ideas. I *eat*, I *drink* ; and, surrounded on all hands with the beauties and riches of nature, I feel a thousand pleasing sensations. Am *I* the cause of these effects ? Did *I* give my first principles, the first rudiments of my body, this wonderful motion, when I was plunged in the night of nothing, and when I knew not what night was ! Did *I* form the many different parts of my body ; *I*, who even at present neither know their arrangement, nor combinations ? Was I more knowing, more expert, when I had no existence ? or did my existence precede that of my thinking principle ? How is it that I cannot determine the point, which separates sleep from waking ? What is the mechanism of my stomach, which digests food without my command, and without the smallest co-operation on my part : and how is it that this digestion is effected ? How is it that all the creatures of the same species are formed as I am ; and why am I not formed in some other way ? Is it *I*, who have created all the beauties of nature, or have they produced themselves ? What makes me susceptible of pleasure and pain ? Who causes bread and water to spring up from the earth, that my body may not pine away ; that the motion of my limbs may not be stopped ?

Who causes the rays of light to fall on my eyes, that I may not be encompassed with perpetual darkness ? Whence proceed the blessings which I experience ; the pain and grief of which I am sensible ? Why am I not always happy ? And why have I been so cruel to myself, as to form myself with so many imperfections ? Does every thing proceed from *me* ? Have I a sufficiency of power and activity for this ? And are my fellow-creatures which I have seen, do see, and may yet see, endued with the same faculties ? Extravagant and contradictory thoughts, which discover the perverseness of those who indulge them ! My soul, notwithstanding all its imperfections and limited state, attests the greatness of that Being who has created it : a Being necessarily self-existent, and infinitely perfect ; on whom I am entirely dependant. This body which I bear, and of whose struc-

ture I am ignorant, proves that there must be a wise workman, whose greatness my feeble intellect cannot fathom ; who has made and arranged these muscles, nerves, veins, and all the parts of which my body is composed in so wonderful a manner.

How could *man*, that weak and limited creature, plan and execute the original of such a machine, so complex and so artfully constructed : whose parts are connected together with so much harmony : he, who is not capable of even taking an exact copy of this original ? There is not the smallest particle of our bodies for which there is not a sufficient reason ; and which is not absolutely necessary, or becomes so by the connexion it has with other parts. Experience, as well as reason, proves this beyond a doubt. And certainly the Creator must be infinitely great, seeing I am not the only creature who can boast that I am formed with so much wisdom, and with such admirable art. Millions of my fellow-creatures, innumerable multitudes of animate and inanimate beings, seem to call upon me with one voice : " Behold the Invisible, acknowledge him in his works ! See how his greatness and perfections are manifest in us all, and in thyself. Behold ! the most insignificant of us lives as well as thou ; it has received, as well as thou, both being and motion. O, bless Him, who has formed us all in so wonderful a way ! "

To thee, O God, the adorable Author of my existence, I owe eternal thanksgiving. It is by thee I live, in thee I move, and from thee I have my being. It is through thy goodness that my soul thinks and reflects, in a healthy body : it is to thee alone that I owe all the pleasures which the surrounding creatures afford me. It is by thy command that all nature inspires me with joy.

Thou waterest the earth, that it may be fruitful ; and that I perish not through lack of sustenance. Thou art He, whom I and all intelligent beings adore : thy goodness, wisdom, and providence, I bless, and recommend myself to thy paternal care for the future. Thou knowest all men ; thou hast thy eye upon them, and observest all their actions. Thou dost not desire that we should pass our time in darkness and distress, and that we should consider our existence as a curse : thou permittest us to enjoy, with a grateful heart, the innocent pleasures of life.

When the bird in the air astonishes me with the rapidity of its flight, the elegance of its form, and the sweetness of its notes, is it not right that I should consider it as thy work ; that its songs are so many hymns to its Creator ; and that they should excite me to praise thee ? Thou providest food for it, as well as for me. It is nourished by seeds, which thou causest to grow up for it ; as I am by the corn which appears to rot in the earth, but, which, at thy command, becomes the support of my life. Thou sendest the rain, and the beams of the sun upon the earth, to cause it to produce the most delicious fruit ; while the utmost of my efforts could not produce a single blade of grass ! It is not merely the necessaries of life which thou grantest us : thou givest besides what the world calls fortune, riches, and

happiness. Thou directest events so, that even those which appear the most unfortunate, often contribute to our happiness: In a word, after having formed us in so admirable a manner, thou preservest us by a continual series of miracles.

O that the precious, though short hours, of my earthly pilgrimage (those hours which can never return) may be employed in such a manner as may best answer the manner of my existence; that when I leave this world, I may enter into a more blessed state, and be better able to fathom the mysteries of nature and grace! May the contemplation of thy wonders, accompanied with the influences of thy Holy Spirit, excite me to celebrate thee, who art my Creator and Redeemer; may I praise thee through all eternity, who art the Being of beings, and the sovereign good of all thy creatures!

SEPTEMBER XVI.

THE STRENGTH OF THE HUMAN BODY COMPARED WITH THAT OF ANIMALS.

ALTHOUGH the human body is externally more delicate than that of other animals, it is nevertheless very nervous, and probably stronger in proportion to its size, than that of the most vigorous creatures. For, if we compare the strength of the lion with that of man, we should consider that this animal, being armed with claws, we are apt to form a false idea of his strength, by the use he makes of them: and we attribute to his strength, what properly belongs to his *weapons*. But, there is a better method of comparing the strength of men and that of animals; and this is by the weight they can carry. Were it possible to unite in one point, or to collect into one effort, all the particular exertions made by an ordinary man in the course of a single day, we should find that such a person would be able to lift every day a weight equal to 1,728,000 pounds a foot from the ground, without any injury to his health. In general, people accustomed to hard labour, can easily carry a burthen of 150 or 200 pounds weight. And common porters often carry burthens from 7 to 800 pounds weight. In London, those who work at the quays, in loading and unloading ships, sometimes carry burthens too weighty for an ordinary horse.

The size of a man's body is, in proportion to that of a horse, as one is to six or seven. If then the strength of the horse were in proportion to the strength of a man, he would be able to carry a load of 12 to 14,000 pounds weight: but there is none that can carry such a burthen; and it is certain, that the horse's strength (if not less) is only equal to that of man, the proportion of size being considered. A learned Frenchman has made an experiment to ascertain the strength of the human body: he had a sort of harness made, by means of which he placed on every part of a man, standing upright,

a certain number of weights, so that each part of the body supported as much as it could bear, relatively to the rest; and there was no part but what had its due proportion of the load. By means of this machine, without being at all over-burthened, the man carried a weight of 2000 pounds?

We may also judge of the strength of man, by the continuance of his exercise, and the lightness of his motions. Men who are accustomed to hunting, outrun horses; and can bear the exercise longer; and even in more moderate exercise, a man accustomed to walk, will travel each day much farther than a horse can. And were each to go only the same number of miles in the day; the horse would be found entirely exhausted with fatigue, when the man would be capable of continuing his journey without any inconvenience. At *Ispahan*, couriers go nearly 130 miles in ten or twelve hours. Travellers inform us, that the *Hottentots* outstrip lions; and that the American savages who hunt the *original*, pursue these animals, though as fleet as stags, till they tire them down, and catch them. A thousand other things are reported of the fleetness of the savages; of the long journeys which they undertake, and accomplish on foot, over the most rugged mountains, and through trackless, uncultivated deserts. It is said that these men perform journeys of *five or six thousand* miles in six weeks, or two months! There is no other creature, birds alone excepted, that can perform such journeys as these. Men, in a state of civilization, do not know their own strength; how much they lose by effeminacy, and how much they might acquire by habit and vigorous exercise. Sometimes we meet with men of extraordinary strength: but this gift of nature, which would be so valuable were it to be employed in their own defence, or in useful labour, is of little advantage in civilized society; where genius does more than bodily strength: and where manual labour devolves on the lowest orders of society.

Here again, we must acknowledge the admirable wisdom with which God has formed the body, and rendered it capable of such activity. But, at the same time, we should pity those indolent men, who spend their lives in idleness, sloth, and effeminacy; and who cannot be persuaded to use their strength, for fear of injuring their health, or destroying their lives! But why has God given us such strength, if not to use it! While then we consume it in effeminate sloth, we refuse to obey the command of our Creator, and render ourselves guilty of unpardonable ingratitude.

May we henceforward use all our strength for the benefit of our fellow-creatures, according to the situation in which God has placed us in this world; and if circumstances should require it, let us earn our bread by the sweat of our brow. Are we not happier than thousands of our brethren, who are worn out with labour and fatigue; who groan under the insupportable yoke of slavery; whose honest foreheads are bathed in sweat; and who, when their strength is nearly exhausted, have no means of procuring any comfort or ease to their oppressed bodies. The more happy we find ourselves, when

Strength of the human body and that of animals compared.

compared to these, the more we should apply ourselves to fill up all our duties : and the success of our labours should lead us to praise God with grateful hearts, who has condescended to grant that strength, which was necessary, and to preserve it to us to the present time.

SEPTEMBER XVII.

THE INSTINCT OF THE BUTTERFLY RELATIVE TO THE PROPAGATION OF ITS SPECIES.

AT this season of the year, butterflies begin to disappear from the creation : but the race is not extinct. This insect lives in its posterity, and by a wonderful instinct, takes care to provide for the preservation of its species. From their eggs new generations spring. But where do they lay their eggs at the approach of the inclement season ? And how can they protect them from the rains of autumn, and the frosts of winter ? Are they not in danger of being drowned or frozen ?

That beneficent Being, who gives wisdom to man, has also condescended to instruct the butterfly how to secure that only legacy which she can leave to the surviving world, by covering over her eggs with a gluey substance which proceeds from her own body. This species of glue is so very tenacious, that the rain cannot penetrate it ; and that the ordinary cold of winter cold cannot kill the young ones which are included in the eggs. But it is remarkable, that though every species follows the same method, from generation to generation, yet there is a great diversity in the measures which different species of the butterfly take for the preservation of their race. Naturalists informs us, that some of these insects lay their eggs in the beginning of autumn, and then die ; lying over and glued to their dear offspring. The sun, which has still considerable power, warms their eggs ; and before winter a numerous troop of little caterpillars are hatched, which immediately begin to spin, and make themselves very spacious nests of this thread, in which they pass the cold season without eating, and almost without motion. When we open these nests, we find that what they have spun serves them for tent, curtains, and mattress. It is still more remarkable, that the butterfly, as well as other insects, lays its eggs only on select plants ; such as are suitable to its young, and where they may find food whenever it becomes necessary : thus, as soon as they are hatched, they are encompassed with those aliments which are fit for them, without being obliged to remove before they are able to take long journeys.

All these things, and many others of the same nature, are well calculated to cause us to admire the wise plans of an all-preserving Providence. If miracles, and things absolutely out of the common course of nature, were not necessary to affect and render us attentive, the consideration of that care which these insects take of their

 Instinct of the butterfly relative to propagation.

young, (cares so various in the different species, but always so regular and uniform in each in particular,) would fill us with the greatest astonishment.

Let us, who are rational beings, learn from these little creatures to preserve in our hearts a love for our posterity ; and to interest ourselves effectually for those who are to come after us. In the projects and enterprises which we form, let us not be discouraged with the thought that death may overtake us before we have accomplished our designs. Let us remember what we owe to society ; and that we ought, at least, to take as much concern in what relates to posterity, as those who have gone before took in matters relative to us. It is particularly the duty of parents, to learn from the mother butterfly, to provide for the children which shall survive them ; and to place them beforehand in the best situation they can. Doubtless, we cannot foresee, nor consequently prevent, the wants and afflictions to which they may be exposed, through unavoidable accidents : but at least we should take care, that their condition should not become miserable through our neglect. Would to God that all parents concerned themselves as much as they ought with the future happiness of their posterity ; that they would not be so imprudent as to leave their families in disorder ; that they would regulate their domestic affairs so well, that after their death their children might not be exposed to vexatious embarrassments ! That they might not have the mortification to see strangers consuming their goods, and enjoying their inheritances !

 SEPTEMBER XVIII.

THE VINE.

WE need only reflect on the vine, to be convinced that complaints against the inequalities of the ground are ill-founded, and unreasonable. The vine never thrives in a flat country ; neither does every hill agree with it ; but only those which look towards the east or south. Hills may be considered the bulwarks of nature, which she invites us to garnish, as we do our fruit-walls ; where the strength of the reflected heat is found united to the goodness of the open air. The most barren hills, and those steep grounds where the plough cannot go, are every year covered with the most beautiful verdure, and produce the most delicious of all fruits. If the soil that nourishes the vine appear so poor and unsightly ; the plant which produces the vine is not more promising in its appearance. Who could have believed that the meanest, most deformed, most brittle, and useless wood in the world, could have produced a liquor so precious, had not experience proved it ? And yet, such is the vegetative energy of the vine, that the sap flows through it with six or eight times the force the blood does in the veins of animals. Farther, the evapora-

The vine.

tion of the vine is so great, that to supply what is exhaled through the leaves, 152 inches of sap must rise in this tree in the space of twelve hours! Who has endued the vine with qualities so superior to the meanness of its origin, and the barrenness of its natal soil? Who gave it such spirit and energy, which not only preserve it for many years, but even enable it to acquire new degrees of strength?

With what wisdom also has God distributed vineyards over the earth! They do not succeed equally in all places; they require to be situated between the 40th and 50th degrees of latitude, about the middle of the globe. *Asia* is properly the country of the vine; whence its cultivation has gradually extended to *Europe*. The *Phœnicians*, who travelled very early over all the coasts of the Mediterranean Sea, brought it to most of the isles, and to the continent. It succeeded wonderfully in the isles of the *Archipelago*, and was thence carried into *Italy*. The vine was there greatly multiplied: and the *Gauls* having once tasted this liquor, determined to possess the country where it was produced: they therefore passed the *Alps*, and conquered both sides of the *Po*. Shortly after, the vine was cultivated in every part of *France*; and at last, on the banks of the *Rhine*, the *Moselle*, and the *Neckar*; and in other parts of Germany.

These observations may give rise to many important reflections. As the most barren soils are the best for the cultivation of the vine; so it often happens, that countries the most impoverished, are most favourable to the cultivation of the Arts and Sciences. In provinces universally despised for their poverty, men of genius have arisen, whose knowledge has illuminated other countries. There is no place so desert, no town so small, no village so despicable, in which certain branches of science may not be cultivated with success. *Encouragement* is all that is wanting. And how abundantly useful might we be, did we take a little pains to promote, as much as possible, the cultivation of the human heart! Sovereigns, preachers, instructors of youth, how much might *you* contribute to the happiness of your cotemporaries and posterity, if, by rewards, exhortations, useful establishments, and similar encouragements, you would endeavour to bring back religion, science, and the social virtues, into ruined cities and wretched villages! Efforts for these purposes are never entirely useless. Either we meet the recompense ourselves, or our descendants gather the fruits of them. At least, we shall be classed with those respectable men, who, in becoming the benefactors of the human race, secure the approbation of God, and the blessing of their fellow-creatures.

The vine, with its dry and shapeless wood, is an emblem of those, who, though destitute of the outward splendour of birth and dignity, are, nevertheless, exceedingly useful. How often does it happen, that men who live in obscurity, and whose external appearance promises nothing, perform actions, and execute enterprises, which elevate them far beyond the sovereigns of the earth? Let us here reflect

The vine.

on JESUS CHRIST himself: to judge of him, from the abject state in which he appeared, we should never have expected such great and astonishing miracles, and works so beneficial to the human race. This JESUS, who, like the unpromising vine, was planted in a barren soil, has borne fruit for the blessing and salvation of the whole earth! He has showed us, that a man may be poor, despised, and miserable in this world; and, nevertheless, successfully labour for the glory of God and the good of mankind.

SEPTEMBER XIX.

A HYMN TO CELEBRATE THE WORKS OF CREATION AND PROVIDENCE.

PRAISE our God! Let all people celebrate him with songs of joy! Sing aloud, and magnify his power and goodness! Adore Him! Bow down before Him! Celebrate, exalt, and glorify the King of nations!

It is He, by whose power the elements, the heavens, and the light have been drawn out of nothing: who has separated the earth from the surrounding waters: his hand formed the sea, and that innumerable host of creatures which live on his bounty.

It is He who has given light and heat to the sun; who has regulated the phases of the moon; who has taught the planets their course; who blazes in the lightning; and who speaks in the thunder!

He is heard in the roaring of the tempest. The strength of the lion, and the organization of the insect, are monuments of his power: and to please men, he has taught the nightingale to form her melodious notes.

He gives to flowers their balsamic odours; he weighs the air, and puts it in motion; he calls forth the winds, and directs them in their course. The sea, which roars at the word of his power, obeys, and stands still at his threatening. God reigns in the depth of the abyss.

Being of beings! How manifest is thy magnificence in thy creatures! Among them, the traces of thy power are marvellous! All creation proclaims thee—every thing says unto me: "Contemplate and magnify thy Maker."

I hasten, O my Creator and Master, to bring thee my tribute of adoration and thanksgiving. Come, ye different creatures, unite with me to celebrate the Creator. Let us bow down before, and adore him. God, who has formed the universe, deserves our homage.

Wonders which God performs daily.

SEPTEMBER XIX.*

THE WONDERS WHICH GOD PERFORMS DAILY.

THE universe, which still subsists in all its beauty, and in that order in which it was first established, is a miracle which we have constantly before us. What an astonishing world is this which we inhabit! How great the number, the magnificence, the variety, and the beauty, of the creatures it contains! What other hand than that of the Omnipotent, could have placed, in this immense expanse, the sun and stars, whose magnitude, and prodigious distance from us, astonish the imagination! Who has assigned them the path they have walked in for so many thousands of years? Who has calculated so exactly the respective powers of all these globes; and who has established so perfect a balance between them and the æther, which supports them? Who has placed the earth at such a due distance from the sun, that it is neither too near, nor too far off? The vicissitudes of day and night, the revolutions of the seasons, the innumerable multitude of animals, reptiles, trees, and plants, which the earth produces, are all the work of God. If a world so admirable were now created before our eyes, who would not consider it as one of the greatest miracles of the Divine Omnipotence.

The particular providence of God is a continual proof of his greatness, power, wisdom, and omnipresence. The continual care which God takes of men, and his marked attention to each, of which every person has the most particular proofs; the various methods he uses to bring men to himself; the paths by which he leads them to happiness; the adversities he makes use of to awaken and bring them to the knowledge of themselves; the extraordinary events which he improves to the advantage of his government; events which are generally produced by trivial causes, and in circumstances which seem to render them impossible: the great changes which he operates to spread the knowledge of his Gospel from one country to another; these are so many effects, in which we ought to acknowledge the ever active hand of God; and cry out with the Psalmist, *This is the Lord's doing; and it is marvellous in our eyes.*

Let us only be attentive to what passes before us, and we shall find God every where: we shall see that in all the ordinary means of grace he is incessantly labouring for our salvation: that his word dwells among us; and we may constantly hear his saving voice. Surely, those who refuse to hear him, and resist the motions of his Spirit; who yield not to his merciful operations; would not turn, though new miracles were wrought before their eyes. Man, who considers that God has created this world, which every where presents so many wonders to him: man, who is every moment loaded with the blessings of the Lord, and who has received from him all the comforts he enjoys; ought he not to believe in, love, and obey him? Yet he resists—What then can affect him?—Whom will he not oppose?

Wonders which God performs daily.

We, who are daily witnesses of the wonders of our God, should be attentive to them ; and not shut our hearts against the truth. Let not prejudice and passion prevent us from meditating on the wonderful works of God. Let us contemplate this visible world, and reflect on ourselves ; and we shall find constant reason to acknowledge Him, who works so many miracles every day before our eyes. Occupied with these great ideas, and struck with astonishment and admiration, we shall then cry out, "Praise, honour, and glory, be ascribed unto God, the supreme good ; and the Redeemer of our souls ! To that God, who alone works wonders ; to that God who fills the hearts of his people with the sweetest consolations : to him, who assuages our pains, comforts us in our afflictions, and who wipes away all tears from our eyes ; to him be glory for ever and ever." Amen.

SEPTEMBER XX.

DIGESTION.

DIGESTION is a wonderful and complex business, which we perform daily, without knowing how ; and without even giving ourselves the least trouble to understand what is most remarkable and essential, in so important a function of the human body. Millions take their food daily, without ever having thought, even once in their life, what becomes of it after it has been swallowed. It is well for us that digestion may be carried on without our perceiving how it is effected : but, is it not desirable to have some idea of the operations of nature in this respect ?

After the food is chewed, divided into very small parts by the teeth, and moistened, it is prepared to pass into the *œsophagus*, or gullet. This is the last function, relative to digestion, in which our wills have any part ; for, all the rest is performed without our knowledge : nor could we prevent it, if we even wished to do so. As soon as a bit is brought into the *œsophagus*, it thrusts it forward by a mechanism peculiar to itself, and forces it into the stomach ; whither its own gravity could not carry it. When the food is brought into the stomach, it is there reduced, by some peculiar means, into a soft paste, of a grayish colour ; which, after being sufficiently attenuated, passes into the first intestine, which is called the *duodenum*. In this, the alimentary mass undergoes new changes. Several small vessels, which proceed from the *gall-bladder*, and from a gland situated behind the bottom of the stomach, called the *pancreas*, open into the *duodenum* ; and pour the bile and pancreatic juice into it ; which are there mixed with the food.

Besides these, there are a multitude of glands in the intestines, which diffuse their humours through every part of the alimentary mass. It is after this mixture that the true *chyle* is discovered among this mass ; and there is much reason to believe, that digestion is completed and perfected in the *duodenum*.

Digestion.

The alimentary mass continues its course through the other intestines, where it is continually moistened by the juices which are secreted in their cavities. The *chyle* begins then to pass into the *lacteal vessels*, which open every where through the intestines, and terminate in the *receptacle of the chyle*. This is situated in that part of the back, where the first and second lumbar vertebræ commence ; from it the *thoracic duct* proceeds, which runs along the *spina dorci*, and opens into the back side of the left *subclavian vein*, near the outside of the internal *jugular*. The chyle flows through this canal, and in order to mix with the blood, it is received into the heart, and dispersed by the arteries and veins over all the body, losing its white, or grayish colour in this circulation.

But there are always some parts of the food which are too gross to be converted into chyle ; or to enter into the lacteal vessels. What becomes of these ? The intestines have a peristaltic, or vermicular motion ; by means of which they alternately contract and dilate ; and thus push downward the matter they contain. This motion having caused the alimentary mass to pass into the third intestine ; protrudes the residuum through the fourth, fifth, and sixth successively.

The substance which may be considered as the husks of the aliments, having arrived at the end of the *rectum*, or last large intestine, would be slowly, and continually evacuated, which would be a terrible inconvenience, had not nature encompassed the mouth of this bowel with a muscle called the *sphincter*, which contracts and keeps it shut. Thus the residuum of each digestion is accumulated in the *rectum* ; and there continues till the quantity, and the irritation which it occasions, indicate the necessity of parting with the whole. Then the muscles of the abdomen and diaphragm, assisting the action of the rectum, surmount the resistance of the sphincter ; and the superfluous matter is expelled.

This is a slight sketch of the manner in which digestion is performed in our body ; digestion, so essential to our health, our comfort, and even our very existence. Let us consider how evidently the wisdom of God appears in all this. What wonderful circumstances must concur, in order to accomplish this end ! The stomach must not only have an inward heat, and a dissolving fluid ; but also a peristaltic motion, by which the food is attenuated and reduced into a soft paste ; and afterward converted into chyle, which being distributed through all the members of the body, supplies them with blood and nourishment. The *saliva*, or spittle, is also necessary ; which has the property of soap, and the virtue of mixing together oily and aqueous matters. There must be also, through the whole course of the intestines, certain machines which separate the various necessary humours from the blood, that the aliments may be sufficiently elaborated, and the chyle brought to perfection. The tongue, the muscles of the cheek, the teeth, and other organs beside, must all concur to divide, grind, and attenuate the aliments, before they descend into the

stomach. How much wisdom is discovered in this ! How inexcusable should we be, were we inattentive to these wonders, and not excited by them to glorify our Creator !

SEPTEMBER XXI.

THE PREVALENCE OF GOOD OVER EVIL IN THIS WORLD.

NOTHING is better calculated to comfort us in the afflictions and trials which we meet with in this life, than admitting, as a fixed principle, that there is more good than evil in the world. Let us consult the most wretched man, and ask him if he can reckon up as many causes of complaint, as he has motives for gratitude ? He would soon find, that however great his afflictions may be, they are not equal to the multitude of mercies which he has received in the course of his life.

To render this truth still more evident ; let us reckon how many days we have enjoyed health, and how very few we have been sick. To the few troubles and disappointments which we have met with in civil and domestic life, let us oppose the many comforts they have afforded us. Compare all the good and innocent actions by which the greater part of men render themselves useful, either to themselves, or to their fellows, with the small number of those which may be termed injurious. Let us reckon, if possible, all the agreeable sensations which each sense affords us. Let us number all the pleasures which belong to every age, state, and profession :—all the gifts which nature bestows in such abundance ; and which human industry knows how to use, so as to procure an infinity of pleasures and conveniencies. Let us reckon the pleasures we felt when we escaped, or surmounted, any danger ; when we gained any victory over ourselves ; or did some wise, or virtuous action. Let us reckon all these blessings, the enjoyment of which we can recollect ; and consider how few of our past mercies we can remember. Let us also consider, that it is only the *habit* of receiving good, which renders us at all sensible of evil : that new blessings cause us to forget those that are past ; and that if the evils we meet with make so deep an impression upon our minds, it is precisely because they occur *seldom* ; and we are not accustomed to them.

Let us reckon the happy occurrences which we may remember, and which, by the way, make but the smallest part of the whole good we have enjoyed ; and let us oppose them to the evils we remember, the great utility of which we do not yet know. I do not say *all* the evils we may remember, for I do not speak of those, which, according to our own confession, have enhanced our blessings, and have been the source of many and great advantages. I do not speak of those little evils, which are preservatives from greater ones ; and which are dispensed to men to make them better and happier ; or to

instruct others by their example : for, evils of this kind are compensated by their advantageous consequences to mankind. In the calculation I wish to make, we must only oppose to the blessings which we recollect, those evils, the usefulness of which we do not yet know : and I aver, that if we make this computation in moments of coolness and serenity, and not in the time of disappointment, vexation, or affliction, we shall be fully convinced, that the blessings we enjoy in this world, vastly overbalance all the evils we meet with.

Why then do men think so little of the continual proofs which they receive of the goodness of God ? Why do they love to dwell on the gloomy side of things, and torment themselves with unseasonable cares and inquietudes ? Does not Divine Providence surround us with pleasing objects ? Why then fix our eyes continually on our infirmities, on what we want, and on evils which may possibly happen ? Why magnify them in our imagination ; and obstinately turn away our eyes from what might make us easy and cheerful ? But, thus it is : the least affliction we meet with, arrests our whole attention ; whilst a long series of happy days slips away without being noticed. We draw distresses and vexations on ourselves, which could never take place were we more attentive to God's blessings. Let us abandon a line of conduct so well calculated to make us wretched. Let us be fully assured, that God has dispensed his blessings over the earth with an impartial hand : that there is no man upon earth that has any real cause of complaint ; but, on the contrary, the most numerous reasons for songs of gratitude, thanksgiving, and praise.

“Blessed be that God, who is our sovereign good ! He fills our hearts with joy and gladness ! If he try us sometimes by afflictions, his consolations soon cheer our souls ; and his goodness condescends to promise us a happiness unclouded, and without end. He leads us by secret, and unknown paths, to the infinite blessings he designs us ! Even the trials which he now and then sends are intended to accomplish the most beneficent ends ; which we shall one day gratefully acknowledge. In the mean time, he permits us not to be tried above our strength ; his powerful and paternal hand still protects us ; and the eye of his mercy is ever open upon us.”

SEPTEMBER XXII.

ENMITY AMONG ANIMALS.

THERE is a constant enmity between animals ; they attack and pursue each other continually. Every element is to them a field of battle : the *eagle* is the terror of the inhabitants of the air ; the *tiger* lives by carnage on the earth ; the *pike* in the waters ; and the *mole* under the earth. It is the want of food which induces these and other animals to destroy one another. But there is an antipathy between certain creatures, which does not proceed from the same cause. It

Enmity among animals.

is manifest, for example, that the animals which twist themselves about the *elephant's* trunk, and never give over till they have stifled him, do not do it in order to procure themselves food. When the *ermine* leaps up, and fixes itself in the ear of the *deer*, or *elk*, and bites them with its sharp teeth ; it cannot be said that these hostilities have been occasioned by hunger. But, there is not an animal on the earth, how small soever it may be, that does not serve for food to some other animal.

I know well, that there are some persons to whom this arrangement of nature appears cruel and improper : but I do not hesitate to assert, that even this antipathy, and the enmity which exists among animals, furnish an excellent proof that all is well ordered. Take animals in the gross, and it is certainly an advantage that some should prey on others : for, on one hand, a number of species could not exist without this : and, on the other, those numerous species, far from being injurious, are useful to the others. Insects, and many reptiles, feed on carrion. Others fix their abode in the bodies of certain animals, and feed on their flesh and blood ; and those same insects are food for other creatures. Carnivorous animals, and birds of prey, kill and feed on other animals. Some kinds multiply so prodigiously, that they would become oppressive, were not this increase interrupted. Were there no sparrows to devour these insects, what would become of flowers and fruits ? Without the *ichneumon*, which seeks and devours the *crocodile's* eggs, this formidable animal would multiply to an alarming degree.

A great part of the earth would be desert ; and many species of creatures could not exist, were there no carnivorous animals. Perhaps it might be said, that they would feed on vegetables ; but were this the case, our fields could scarcely produce herbage enough for *sparrows* and *swallows*. Besides, the structure of the bodies of carnivorous animals must be different from what it is now : and how could fish, for instance, find subsistence, were they not to live on the inhabitants of the waters ? There is reason also to suppose, that animals would lose a great deal of their vivacity and industry, were it not for the continual wars among them. The creation would be less animated, beasts would become stupid, and man himself lose a great part of that activity which is now employed against the incursions of destructive animals. Finally, many striking proofs of the wisdom of God would be wanting, were there an universal peace among animals : for the cunning sagacity, and wonderful instinct with which they lay snares for, and surprise their prey, sufficiently point out the wisdom of the Creator.

So far then is the enmity among animals from casting a shade over the wisdom and goodness of God, that these perfections shine with new lustre from this very circumstance. It seems to have entered into the plan of creation, that certain animals should feed upon others. We might indeed complain of this plan, if the entire destruction of any species should be the result ; but this never happens ;

Enmity among animals.

and the constant wars among animals are, on the contrary, the real cause of preserving a perfect balance. Thus, carnivorous animals are the indispensable connecting links in the chain of beings : and on this very account, their number is small, compared with that of useful animals.

It is further worth remarking, that the strongest and most savage animals have commonly less understanding and cunning than the others : they either destroy each other reciprocally, or their young become food for other beasts. Hence it is that nature has endowed the weakest animals with so much industry, and so many means of defence. They have that instinct, delicacy of sense, swiftness, address, and cunning, necessary to counterbalance the strength of their enemies. Is there any who cannot behold in this the infinite wisdom of the Creator ? Or, who will not acknowledge that the state of warfare among animals, which at first sight appears so strange, is, nevertheless, a real good ? We should be still more convinced of this, could we take in the whole system of things : and the relations and connexions which the different creatures have with each other.

But, this degree of knowledge is reserved for the other world ; where the Divine perfections shall be manifested to us in their infinite splendour. Yet, even in this world, we may be able, in some sort, to comprehend why this hostility among animals is necessary. But it is absolutely incomprehensible, why divisions and destructive wars should reign among *men*, the most noble of all creatures. Alas ! It must be confessed, to the scandal of humanity, that men are found who even dare to profess the Christian religion, while more ferocious and destructive than the most savage beasts : their hostilities are more multiplied ; and they make use of means the most dexterous and secret to destroy each other. Lions, tigers, and vultures, are lambs and doves, when compared to *man*. Nothing can be more foreign to the merciful designs of God than this. His intention was, that each man should render himself useful to his fellow-creatures ; and contribute, as much as possible, to their comfort and happiness : that he should be their defender, benefactor, guardian, and god ; in a word, that every man should render to another all the good offices within the limits of his power. Let none of us counteract these merciful designs of the Lord : but let us endeavour to live below in peace and concord. Let animals destitute of reason, persecute, hate, and destroy one another ; but, let *us* follow the example of *JESUS CHRIST* ; and endeavour to render each other happy.

 SEPTEMBER XXIII.

THE MORAL USES OF THE NIGHT.

THE days begin to shorten, and the nights grow long : and many people are discontented with this arrangement of nature. They perhaps secretly wish, that there were no night ; or, at least, that the

Moral uses of the night.

nights were all the year round as short as they are in June and July. But, such wishes are unreasonable, and betray our own ignorance. If we would take the trouble to reflect on the advantages which result from the vicissitudes of day and night, we should not be so precipitate in our judgments, nor make such groundless complaints ; but rather acknowledge the usefulness of the plan, and bless God for it.

First, what is well calculated to make us perceive the moral utility of the night, is this ; that it interrupts the progress of most vices ; or at least, of those which are most injurious to society. Darkness obliges the wicked man to take rest, and procures some hours of relief to oppressed virtue. The unjust, or fraudulent merchant, ceases, during the night, to cheat his neighbour ; and when darkness arrives, a thousand disorders are arrested. Were men to be twice as long awake as they are at present, to what a frightful degree would evil actions of every kind be multiplied ! The wicked, by giving themselves up uninterruptedly to vice, would acquire a horrible faculty of sinning. In a word, we may assert, that the longer the nights are, the fewer crimes are committed in the space of the twenty-four hours : and this is certainly not one of the least advantages which we derive from the night.

Of how much instruction and mental pleasure should we be deprived, were there no night ! The wonders of creation, which the starry heavens present, would be lost to us. But, as each night shows us the magnificence of God in the stars ; we may raise up our hearts to him, and feel more sensibly our own littleness. If every occurrence which reminds us of God should be precious to us ; how ought we to love the night, which proclaims to us in so energetic a manner the perfections of God ? Did we pay proper attention to this subject, no night would appear too long ; each would be beneficial to us ; and one spent in meditating on the works of God, might have the happiest influence over our future life. Let us therefore contemplate attentively that immense theatre of the wonders of God which the night discovers to us. A single good thought which this grand sight may occasion ; a thought with which we may go to sleep, and with which we may awake ; with which we may entertain ourselves during the course of the day ; may be of the utmost utility to our understanding and to our heart.

In general, night is a very advantageous time for those who love to meditate, and to use self examination. The tumult and dissipation in which we commonly live during the day, leave us but too little time for recollection ; for detaching our affections from the earth ; and for occupying ourselves seriously about our latter end, and the duties of our station. The tranquillity of the night invites us to, and assists us in, these serious occupations. We may then, without interruption, converse with our hearts, and acquire the important science of self-knowledge. Our souls may collect all their powers, and direct them to the objects which relate to our eternal happiness. We may then

banish the evil impressions which we receive from the world ; and get our souls fortified against the seducing examples of the age. This is the time in which we may meditate on death without distraction ; and employ ourselves in the great concerns of the eternal world. The tranquil solitude of our closets is favourable to religious thoughts ; and will inspire us with an ardent desire to be more and more occupied in this sacred work.

Let all the nights with which God may bless us, be sanctified by these salutary meditations. Then, far from murmuring at the vicissitudes of night and day, we shall praise God for them ; and bless the night, in which we have learned to know our own wretchedness better, the glory of the Lord, and the things which pertain to our eternal peace.

SEPTEMBER XXIV.

THE CAUSES OF MEN'S INDIFFERENCE ABOUT THE WORKS OF NATURE.

WHENCE is it that men are so indifferent about the works of God in nature ? An answer to this question may give rise to various important reflections.

The *first* cause of this indifference is *inattention*. We are so accustomed to the beauties of nature, that we neglect to admire that wisdom, the impress of which they bear ; and are not as grateful as we ought to be for the innumerable advantages which we derive from them. There are too many people who resemble the stupid beast who feeds on the herbs of the field, and quenches his thirst at the stream, without ever reflecting whence these blessings which he enjoys proceed ; and without acknowledging the goodness and wisdom of Him who bestows them. Thus men, though endowed with the most excellent faculties, by which they are enabled to participate more of the blessings of nature, seldom think of the source whence they flow. And even where the wisdom and goodness of God are the most strikingly manifested, they are little affected, because they are so accustomed to the displays of his power : habit renders them indifferent and insensible, instead of exciting their admiration and gratitude.

A *second* cause of this indifference in many people is *ignorance*. How many are there who are wholly unacquainted with the most common phenomena of nature ? They see the sun rising and setting every day : their fields are moistened sometimes with rain and dew, and sometimes with snow. The most wonderful revolutions take place under their notice every spring ; but they give themselves no trouble to inquire into the causes and purposes of these phenomena, in respect to which they live in the most profound ignorance. It is true, there are a thousand things which will ever be incomprehensible to us, however diligently we may study : nor are we more sensi-

ble of the limited state of our knowledge, than when we endeavour to fathom the operations of nature. But we may at least acquire historical knowledge of them; and the meanest labourer may comprehend how it comes to pass that the seed which he sows in the ground, buds and springs up, if he will take but a little trouble to inform himself on the subject.

Thirdly. Others disdain nature's operations, because they are wholly employed in their private interests. I am satisfied these would be more attentive observers of nature, if, for instance, *spiders spun threads of gold*; if *lobsters contained pearls*; and if the *daisy* possessed the virtue of restoring *old men to youth*. In general, we value things only according to interest, or fancy. The objects which do not immediately and sensibly gratify our inordinate desires, we judge unworthy our attention. Our self-love is so unreasonable, and we know so little of our true interests, that we despise the things which are of the greatest use. Corn, for instance, is of all other plants, the most indispensably necessary to our subsistence; and, nevertheless, we see whole fields covered with this very useful production of nature, without paying proper attention to it.

Fourthly. Many neglect the contemplation of nature through *indolence*: they are too fond of ease, to take a few hours from their sleep to contemplate the starry heavens: they cannot persuade themselves to rise early in order to see the rising sun: they dread the fatigue of stooping to the ground to observe the admirable art which appears in the formation of the grass. And yet these very people, who are so fond of their ease and comfort, are full of ardour and activity when the gratification of their passions is the object. It would be a kind of martyrdom to the intemperate man, and to the gamester, to be obliged to consecrate those hours which they spend in drunkenness and gaming, to the contemplation of a beautiful starry sky. A man who loves walking, and would go many miles on foot to see a friend, would take it very ill to be obliged to go two miles to observe some singularity of nature.

Fifthly. Others neglect the works of God in nature, through a principle of *irreligion*. They do not wish to know the greatness of God. They have no taste for piety, nor for the duties it prescribes. To praise and love God, and to be grateful to him for the benefits he has conferred on them, would be to them disagreeable and painful duties. We have too much reason to believe that this is one of the principal causes of that indifference which many have for the works of God. If they valued the knowledge of God above all things, they would eagerly embrace every opportunity of establishing themselves in that knowledge, and of perfecting their love to their Creator.

Two thirds, probably, of mankind, may be ranked in the different classes which we have already pointed out. At least it is certain, that there are very few who study the works of God in a proper manner, and delight in them. This is a melancholy truth, the proof of which is daily exhibited. Would to God that we could at last be

convinced how ill it becomes men to be thus insensible of, and inattentive to, the works of the Creator; and how by this conduct they degrade and debase themselves below the very brutes! What! have we eyes, and shall we not contemplate the beauties which every where surround us? Have we ears, and shall we not listen to the hymns which every part of the creation sings to the praise of the Lord? We wish to see him in the kingdom of his glory; and shall we refuse to contemplate him here below in his admirable works? Let us renounce an indifference so criminal, and endeavour henceforth to feel something of that joy which David felt, as often as he reflected on the works, the magnificence, and the glory of his Creator.

SEPTEMBER XXV.

ON SEVERAL NOCTURNAL METEORS.

WHEN the sky is pretty clear we often observe a circular light, or large luminous ring, round the moon, which is called a *halo*, or *crown*. Its outline has often the faint colours of the rainbow. The moon is in the centre of this ring, and the intermediate space is generally darker than the rest of the sky. When the moon is at the full, and high above the horizon, the ring appears most luminous. It is often of a considerable size. We must not imagine that this circle is really round the moon: we must seek the reason of it in our own atmosphere, the vapours of which cause a refraction of the rays of light which penetrate them, properly adapted to produce this effect.

There appear sometimes round, or on one side of the real moon, some false ones, which are called *paraselenes*, or *mock-moons*. These are apparently of the same size of the moon; but their light is paler. They are generally accompanied with circles, some of which are coloured like the rainbow, others are white, and several have long luminous tails. All these phenomena are only illusions produced by *refraction*. The light of the moon falling on aqueous, and sometimes frozen vapours, is refracted in various ways; the separated rays appear coloured, and reaching the eye of the spectator, double the image of the moon. Sometimes (but such appearances are very rare) we see in moonlight, after a heavy fall of rain, a *lunar* rainbow, which has exactly the same colours as the *solar* rainbow, only fainter. This is also occasioned by the *refraction* of the rays of light.

When sulphureous and other vapours, take fire in the higher atmosphere, we often observe streaks of light dart swiftly like rockets. When these vapours collect in a mass, take fire, and fall down, we think we see little balls of fire falling from the sky; and as, from their distance, they appear about the size of stars, they are on this

 On several nocturnal meteors.

account called *falling stars*. The common people think they are real stars, which change their places, or are dissipated, or purified. Sometimes these imaginary stars are very brilliant, and magnificently coloured; descend slowly, always acquiring new lustre, till at last they are extinguished in the vapours of the lower atmosphere, and falling on the earth, leave (as is supposed) a gluy, viscous substance behind them. Great globes of fire have sometimes been seen, more luminous than the full moon, with long tails. They are probably sulphureous and nitrous vapours, which accumulate and take fire; for they traverse the atmosphere with great velocity, and afterward burst with a loud noise. Sometimes, when the inflammable particles of which they are composed, are of a different nature, they disperse without noise in the higher regions of the atmosphere.

The little *flashes*, which we see so often in the summer evenings, after intense heat, are produced by vapours in the atmosphere, which are less visible, because they are higher up. This meteor is distinguished from real lightning, by its never being accompanied with thunder. It is probable, however, that these flashes are the reflection of lightning, which is at too great a distance for us to hear the peal of thunder with which it is accompanied. For a flash at the height of a mile, may be seen at the distance of more than one hundred miles, and its reflection further still, though the thunder can scarcely be heard further off than ten or twelve miles.

The *flying dragon*, the *dancing goat*, the *burning beam*, and various other meteors, owe their odd names to their singular appearance. They are only gross and viscous exhalations, which ferment in the humid regions of the lower air; and which, being pressed in different directions by the agitated atmosphere, assume different forms, to which the common people give those extraordinary names. Several naturalists have imitated these in miniature, by mixing certain inflammable substances together.

Of all the nocturnal phenomena, none is more remarkable, or, on the whole, more brilliant, than the *aurora borealis*, or northern lights: they are seen generally from the beginning of autumn till the commencement of spring: when the weather is clear and serene, and the moon does not give too much light.

The *aurora borealis* has not always the same appearance. It is usually towards midnight that a brightness, similar to the dawn of day, begins to appear. Sometimes we observe streaks, and sudden jets of light, with white and luminous clouds in perpetual motion. But when this meteor is to be exhibited in all its perfection, we generally see (if the weather be calm and clear) towards the north, a thick and dark cloud; the upper part of which is edged with a white and luminous border, which emits rays, brilliant jets, and resplendent pillars: which arising from moment to moment, grow yellow and red; afterward meet, unite, and form thick and luminous clouds; and finally terminate in various coloured clouds, white, blue, fiery red, and the most beautiful purple: whence rays of light are continually

shooting out. At such a time, the *aurora borealis* is in all its pomp and splendour.

How great is the magnificence of God! Even the night itself proclaims his majesty. How can we complain that at this season, the nights are gradually increasing in length; seeing they present us with such magnificent sights as interest both our minds and hearts? The phenomena of which we have spoken, render the long nights of the inhabitants of the northern nations not only supportable, but even brilliant and pleasing.

Our nights, which are much shorter, might, nevertheless, afford us diversified pleasures, would we pay a proper attention to such a phenomena. May we accustom ourselves to raise, not only our eyes, but our hearts, to heaven! May we soar beyond moons and stars, to thee, our Creator; that we may reflect on thy majesty, and silently adore thee when our eye is struck with the magnificent spectacle of the night! For thou, O Lord, art great: the silence of the night loudly proclaims thy power and love. The moon in azure plains announces thy majesty! The host of stars which burn in the firmament, celebrate and praise thee! The mild light of the *aurora borealis*, which we see above our heads, discovers the perfections of our God.

SEPTEMBER XXVI.

THE FORMATION OF THE CHILD IN ITS MOTHER'S WOMB.

THIS seems to be one of the most impenetrable mysteries in nature. For several centuries the most eminent naturalists have neglected nothing to find out how the generation of man is effected: but even to the present time we have nothing on the subject but *conjectures*. The following seem to be nearest the truth.

The seminal liquor is properly what fecundates the egg in the mother's womb: the matrix, or womb itself, is the place in which this fecundation takes place. This liquor is included in the seminal vessels, and by the assistance of a microscope we can discover long and regular bodies, which seem to be divided into an infinity of little globes. On each side the matrix, there is a substance of an oval form, which is supposed to be the ovaries; and in which certain round vessels are found, full of clear lymph. When the most spirituous parts of the seminal liquor have penetrated the ovaries, fecundation takes place. The impregnated egg then detaches itself from the ovaries, falls into the matrix, and remains there till all is matured. Possibly the embryo may exist in miniature in the egg before impregnation; and the seminal liquor may answer no other end than merely to stir up, animate, and put the principle of motion into play, and so dispose it to unfold itself by means of the warmth.

 Formation of a child in its mother's womb.

However the business of conception may be effected, it is a fact, that shortly after impregnation, the growth of the foetus becomes sensible. *Three* days after, a small bladder of an oval form is found in the matrix : the membrane of which it is formed is extremely fine, and it is filled with a lymphid fluid, very near resembling the white of an egg. In this, some small connected fibres may be seen, which are the first rudiments of the foetus. *Seven* days after, a little oblong mass may be seen ; from the centre of which some fibres proceed, which are the first rudiments of the umbilical cord. *Fifteen* days after conception, the nose appears like a little prominent thread, the mouth like a line, the eyes like two black points, and the ears like two small holes : the arms and legs also begin to appear like small protuberances. At the end of *twenty-one* days the arms and legs are easily distinguished, the ribs, fingers, and toes appear like little threads. In *one month* the foetus is an inch long, and lies in a crooked posture in the surrounding fluid, and the human form is very perceptible. The toes and the fingers are distinct from each other ; the skin is extremely fine and transparent ; the viscera are like fine threads ; the bones still soft : the vessels which are to form the umbilical cord, are as yet in a straight line, along side of each other. The *placenta* occupies no more than the third of the whole mass, whereas at the first it occupied one half ; but it has now increased much in thickness and solidity. The whole mass is still of an oval form, being, in its longest diameter, an inch and a half, and in its shortest, an inch and a quarter : the two little skins become more and more apparent. In *six weeks* the human form becomes perfect ; only the head is longer than the proportion it should bear to the rest of the body. About this time the heart may be seen to move : and at this stage it has been known to beat a considerable time after it had been separated from the mother's womb. In *two months* the foetus is two inches long : the ossification is evident in the legs and arms ; and in the point of the lower jaw, which at this time projects much beyond the upper one : the umbilical cord also about this time begins to turn and twist. *Three months* after conception, the foetus is nearly three inches long ; and is from six to seven, in *four months and a half*. Then the nails appear. If it be a male, the testicles may be seen enclosed in the belly below the reins. The stomach is filled with a certain thickish fluid, something like that in which the embryo floats : the small bowels containing a milky substance, and the large ones a black liquid matter. There is now a little bile in the gall-bladder, and a little urine in the bladder. The head is bent forward, the chin rests upon the breast : the knees are drawn up, and sometimes almost touch the cheeks : the legs lie close to the thighs : one of the hands touches the face, and sometimes both ; at other times the hands hang down along the sides. From this time the growth of the foetus goes on rapidly, and without interruption, till at the *ninth month* it abandons its prison, and emerges into day.

Behold an epitome of the history of the formation of a child in the womb! What a number of things are included in it, which may well fill us with astonishment; and cause us to admire the power and wisdom of God! The whole process, from the moment of our conception to that of our birth, is a series of wonders: and there may be many others which have escaped our notice, and which we cannot discover. Let this assemblage of wonders excite us to adore that God who has formed us. Let us look back only through a few years, and we find we had no existence! And, how is it that we came out of nothing? We have not created ourselves: that Infinite Being who created the world, has given us our existence: and why has he brought us into being? Is it not that we might live in such a manner as becomes the dignity of an intelligent creature, created and redeemed for eternal happiness?

SEPTEMBER XXVII.

OF AMPHIBIOUS ANIMALS.

BESIDES quadrupeds, fishes, and birds, there is also a species of animals which can live either on the earth, or in the water, and on this account are termed *amphibious*. They are all cold-blooded, have something gloomy and disgusting in every part of their form: of a dull and disagreeable colour; a bad smell, a hoarse voice; and many of them are very venomous. Instead of bones these animals have cartilages. The skins of some are smooth, and those of others covered with scales. Most of them hide themselves in dirty infected places. Some are viviparous, others are oviparous. The former do not hatch their eggs, but leave them to the warmth of the air, or that of the water. Sometimes they even lay them on dunghills. Almost all creatures of this species live by prey, which they procure either by strength or subtlety. In general they can bear hunger a long time, and live a laborious life. Some walk, others creep: and this divides them into two classes.

The *first class* consists of those which have feet. The *tortoise*, which belongs to this class, is covered with a kind of shell, resembling a buckler. Land tortoises are the smallest. Those that live in the sea are five ells in length, and from eight to nine hundred pounds weight.

There are different kinds of *lizards*: some have a smooth skin, others are covered with scales. There are some which have wings, some without. Those with wings are called *dragons*. Among those which have no wings are reckoned the *crocodile*; the *cameleon*, which can live six months without food; the *salamander*, which has the property of living some time in the fire without being consumed: because the cold slimy fluid which it throws out in all directions, extinguishes the coals. The *crocodile* is the most formidable of all

Amphibious animals.

this class. This animal comes out of an egg, which is about the size of that of a goose ; and grows to such a prodigious size, that it is from 20 to 30 feet long. It is voracious, cruel, and cunning.

Serpents constitute the *second class* of amphibious animals. They have no feet ; but creep by a winding vermicular motion, by means of the scales and rings with which their bodies are covered. The vertebræ of their backs have a peculiar construction, which favours this sort of motion. Many of these serpents have the property of attracting birds, and other small animals, on which they prey : seized with terror at the sight of the serpent, and perhaps rendered giddy with its venomous exhalations, these birds have no power to fly away, but fall into the gaping mouth of their enemy.

As the jaws of serpents may be greatly extended, they sometimes swallow animals whose bodies are larger than their own heads. Several serpents have fangs in their mouths very like their other teeth. These are a species of darts, which they let out and in as they please, and by this means they eject in the wound which they make, a poisonous humour, which comes from a little bag, placed at the root of the tooth. This poison has the singular property of being injurious only to wounds ; for it may be taken internally without any danger. The serpents provided with arms which have been just mentioned, are but about the *tenth* part of the whole species : none of the rest are venomous ; though they will dart at men and animals with as much fury as though they could kill them. The *rattlesnake* is the most dangerous of all. It is ordinarily from three to four feet long, and as thick as the thigh of a full grown man. Its smell is strong and very unpleasant : it seems as if nature had designed this, as well as its rattles, to warn men of its approach, that they might have time to escape. This reptile is most furious when it rains, or when it is tormented with hunger. It never bites till it has coiled itself into a circle ; but the quickness with which it assumes this form is incredible. To coil itself up, to prop itself upon its tail, to dart upon its prey, to wound and retire, are to it the work of a moment.

Some probably may say, why has God created such animals, which seem only to exist for the torment and destruction of man ? This question, and many others like it, show that we only think of ourselves ; that we form rash judgments, and are prone to find fault with the works of God. Considered in this point of view, these questions are highly unbecoming and culpable. But if such questions be asked in order to get a deeper conviction of the wisdom and goodness of God in the works of creation ; they are not only proper in themselves, but highly necessary to those who wish to know the reason why God has formed so many noxious creatures ? To those then, who are well disposed, and who seek information, I address myself. Perhaps it may appear to you, that such creatures as *lizards* and *serpents* were not created for the general good of the world. This judgment is rash ; for, if among amphibious animals, some are formed which do much mischief, it is certain that most of them are quite

Amphibious animals.

harmless. And is it not a proof of the goodness of God that only the *tenth* part of serpents is venomous? Besides, even those which are mischievous, have their bodies so formed, that it is generally easy to escape them. How formidable soever (for instance) the *rattlesnake* may be, it cannot conceal its approach: its rattles give us timely warning to provide for our safety. It is also worthy of notice, that Providence has opposed to every reptile an enemy that can conquer it. The *hog* every where seeks the *rattlesnake* that he may devour it: besides, a child is strong enough to kill the most terrible of them; for a slight blow with a stick across their back is almost immediate death to them. Further, it would be very unjust to dwell so much on the mischief which these animals *may* do us, without considering the good which they *actually* do. Some amphibious animals are useful for food; others for medicine: and the shell of the tortoise is of very great service. In a word, the Divine wisdom is as conspicuous here as in all other things. To reflect on these perfections of the Lord, to admire and adore them, is a duty we should perform, when we behold creatures which appear to be injurious; but it is always unbecoming in us either to condemn or murmur against his plans. And this would be still more culpable, as our understandings are too limited to comprehend the various uses for which such creatures may be designed.

SEPTEMBER XXVIII.

THE PERFECTION OF THE WORKS OF GOD.

WHAT can equal the perfection of the works of God; and who can describe the infinite power which is manifested in them? It is not enough that their magnitude, number, and variety, fill us with admiration; for, each particular work is formed with such infinite skill, each is so perfect in its kind, that the exactness and regularity of his smallest productions announce the unlimited grandeur and wisdom of their Author. We are, with reason, astonished at the different arts which the moderns have invented; by means of which they accomplish things which would have appeared supernatural to our ancestors. We measure the height, breadth, and depth of bodies; we know the orbits of the planets, and can direct the course of the rivers: we can raise or depress waters; construct moveable buildings on the sea; and we accomplish a number of other works, which are an honour to the human understanding. But what are all the inventions of men, their most magnificent and beautiful works, in comparison of the least of the works of God? How weak, how imperfect the imitations! How far is the original above copy! Let the most eminent artist employ all his power to give his work a pleasing and useful form: let him smooth, perfect, and polish with all possible care; and after all his labour, all his diligence, all his efforts, let him

view this masterpiece through a microscope, and see how coarse, ill-shaped, and rough it will appear ! How great a want of regularity and proportion he will discover in it ! But whether we examine the works of the Almighty with the naked eye, or through a microscope, we shall always find them equally admirable and beautiful. Perhaps through the microscope they may appear very different from what they seemed to the naked eye ; but we shall ever see the most exquisite figures, together with incomparable proportion, order, and harmony.

The Divine Wisdom has formed and arranged all the parts of each body with infinite skill, according to number, weight, and measure. Such is the prerogative of a power which is unlimited ; that all its works are regular and perfectly proportioned. Admirable order reigns through the whole of his works, from the least to the greatest. All is in perfect harmony, all is well connected, so that we find no breaks ; no link is wanting in the immense chain of created beings : nothing is misshapen : every part is necessary to the perfection of the whole : and each part, considered separately, is as perfect as it ought to be. Can we describe the innumerable beauties, the varied charms, the pleasing mixture of colours and hues, with all the ornaments so diversified, of the fields, plants, and flowers ; vallies, mountains, and forests ? Is there a single work of God, but has its peculiar and distinct beauty ? Is not that which is most useful, at the same time the most beautiful ? What an astonishing variety of forms, figures, and sizes, do we see among inanimate creatures ? But, there is still a more abundant variety in animated nature : nevertheless, each is perfect, and nothing deficient, nothing exuberant is found in either. How great, therefore, must His power be, who, by a single act of his will, has caused all these creatures to exist !

But, to admire the power of God, we need not go back to the time when his omnific word called all things out of nothing ; when every thing was instantaneously brought forth ; and yet in a state of perfection.—Do we not each spring behold a new creation ? What can be more wonderful than the revolutions which then take place ? The valleys, fields, meadows, forests, all, in some sort, die at the end of autumn ; and nature is spoiled of all her ornaments in the winter. All animals languish, the birds hide themselves, and are silent ; all becomes desert, and nature appears benumbed and insensible. Nevertheless, a Divine power acts in secret, and labours for the renewal of nature unobserved by us. Animation is restored to benumbed bodies ; and every thing is in expectation of a sort of resurrection.

How can we be spectators so often of this magnificent spectacle, without admiring, with more profound veneration, the power and glory of the Most High ! How can we ever breathe the cool refreshing air, without being led to such reflections ? Does not God manifest himself in nature, as well as in revelation ? Should we ever rest under the shade of a tufted tree, should we ever see a field enamel-

led with flowers, a beautiful forest, or waving corn ; should we ever pluck a flower, or enter a garden, without remembering that it is God who has given the tree its foliage, the flowers their beauty and perfume ; the woods and meadows their pleasing verdure ; that it is He “ who causes bread to spring out of the earth, wine that maketh glad the heart of man, and oil to make his face to shine ? ” Struck with admiration, and penetrated with gratitude and love, we shall exclaim with the Psalmist ; “ O Lord, how manifold are thy works, in wisdom hast thou made them all ; the earth is full of thy goodness ! ” *Psa. civ. 14, 15—24.*

SEPTEMBER XXIX.

FRUIT.

THIS is the blessed season in which the Divine Goodness pours out to us fruits of every kind, in the richest abundance. “ The charms of summer give place to more solid enjoyments : delicious fruits supply the absence of flowers. The *golden pippin*, whose beauty is increased by purple streaks, causes the branch which bears it to bend down. The mellow *pear*, and the *plum*, whose sweetness rivals honey itself, display their beauty, and seem to invite the hand of their master.” Should we not be inexcusable, if, at the sight of all these blessings with which we are laden through the munificence of God, we did not endeavour to sanctify the pleasures of autumn by reflecting on the kindness of our Maker ?

With what wisdom has the Creator distributed fruit through the different seasons of the year ! It is in summer and autumn principally, that nature has made us these rich presents : but, by the assistance of art, we are also favoured with them both in winter and spring : and our tables may be furnished with certain kinds, through the whole course of the year. From the beginning of *June*, nature herself, without the assistance of art, furnishes *raspberries*, *gooseberries*, and common *cherries*. The month of *July* furnishes our tables with *cherries*, *peaches*, *apricots*, and some kinds of *pears*. *August* seems rather to *lavish* than *give* its fruits : *figs*, late *cherries*, and a variety of excellent *pears*. *September* provides us some *grapes*, *winter pears*, and *apples*. The presents of *October* are different kinds of *pears*, *apples*, and the delicious fruit of the *vine*.

It is with this wise economy, that nature measures out, and distributes her gifts ; on the one hand, that we may not be overloaded with too great an abundance ; and on the other, that we may still have a successive variety of enjoyments. It is true, that in proportion as we advance into the winter season, the number of good fruits diminishes considerably : but art has taught us to preserve some even for this season. God has not thought proper to dispense with our labour in this business : he wills that we should be ever active ; and

Fruit.

that we should diligently labour to supply our own necessities. Hence it is that God has distributed his blessings with such variety; and has purposed that they should spoil, or be destroyed, if proper care be not taken to preserve them.

How abundantly has God distributed fruit to us! Notwithstanding the continual ravages of birds and insects, there still remains a sufficient quantity to compensate for this loss. Reckon only, if possible, the number of fruits which a hundred trees bear in one favourable year; and you will be astonished at the result, and admire that prodigious multiplication which extends *ad infinitum*.

And what was the design of such abundance? If the propagation and preservation of trees were the only design, much less would, without doubt, have answered that end. It is therefore evident, that the Creator wished to provide for the nourishment of men; and in particular for the poor and necessitous. By giving them so much fruit, he has furnished them with a cheap mode of subsistence, both wholesome, nutritious, and pleasant: so that they have no reason to envy the rich their far-fetched dainties, so often injurious to health.

There is scarcely any thing more nourishing than *fruit*. It is through the benevolent attention of Providence that we have them in a season when they are not only pleasing refreshments to us, but excellent medicines. *Apples* come seasonably in the heats of summer, because they moderate the heat of the blood, and cool the stomach and intestines. *Plums* have a grateful acid, and an unctuous and emollient juice, which render them helpful in many cases. They purge gently, and correct the acrimony of the bile and other humours, which so often occasion inflammatory disorders. And, if there be certain fruits, the use of which is found to be unwholesome, as some think *peaches*, *apricots*, and *melons* to be, it is a proof that they are not designed for our climate, or at least for those persons who cannot obviate, by the use of wine and aromatics, the evil effects which their excessively cooling quality may produce.

Nothing can be more delicious than fruits. Every species has a flavour peculiar to itself: and had they all the same taste, they would certainly lose much of their value; but this variety renders them vastly more pleasing. Thus, God resembles a tender father, who provides not only for the support, but also for the pleasure of his children.

While using fruits, let us never forget the bounty of the beneficent Being who has dispensed them. Let us feel it our most sacred duty, to consecrate ourselves entirely to the service of so tender a parent. How great shall our happiness be, if we sincerely devote ourselves to him! What a blessed satisfaction, what pure and exalted pleasures shall we then taste! And what a glorious hope may we indulge of future happiness!

A hymn of praise, imitated from the cxlvi. Psalm.

SEPTEMBER XXX.

A HYMN OF PRAISE TO GOD, IMITATED FROM THE CXLVII. PSALM.

PRAISE ye the Lord, for he is omnipotent ! He counts the stars, and calls them all by their names. Earth and heaven celebrate him ; his name is great and glorious ; he governs with majesty ; celebrate the Almighty !

Unite your voices to bless the God of love ! Ye who are distressed, come to him : come to your Father ; he is gentle, merciful, and gracious : every thing proves that he is a God of grace and love.

His heavens become dark : but it is to water the earth with fruitful rains. Our fields are covered with verdure : grass grows, and fruits ripen ; for his clouds pour down his bounty. The Lord is full of kindness.

Let every thing that has breath glorify the Lord !—Birds, beasts, fish, insects, nothing is forgotten ; all are objects of his care : all are nourished by his bounty. Let us magnify and praise our heavenly Father !

Behold how he supports and comforts those who trust in his mercy ! Often one friend cannot aid another ; and the greatest strength of man cannot save him from danger. Alas ! Alas ! for the mortal who seeks vain supports !—Rest on the Rock of Ages : he is the only Saviour.

Render him thanks, because he has made his will known unto you ; and given you his laws and his precepts. His word is a source of life and salvation ! O ye people of his covenant, how great is your happiness ! Praise, celebrate, and exalt the God of truth !

 SEPTEMBER XXX.*

THE UNIVERSE INVITED TO PRAISE GOD.

GREAT is the Lord ! Innumerable heavens are his pavilion : the thunder-cloud is his chariot, and the lightning walketh by his side.

The lustre of the morning is but the reflection of the hem of his garment ; when his splendour goes forth, the light of the sun is eclipsed.

Praise the mighty and gracious Lord, ye luminaries of his palace : ye solar rays, flame to his glory ! Thou earth, sing to his praise.

Celebrate him, thou sea ; foam, ye billows, to his honour ; ye rivers, praise him in your course ! Ye lions of the forests, roar to his glory ! Sing, sing to him, ye feathered inhabitants of the air !

Reiterate his praises, ye echoes ! Let all nature, in joyous concert, sing to his honour ! And thou, O man, lord of this lower world, mingle thy thanksgiving with the universal harmony !

 Universal praise.

He has done more for thy happiness than for all the rest : he has given thee an immortal spirit ; thou canst comprehend the structure of the universe, and art acquainted with the wheels of nature.

Exalt him high for thy own salvation : he needs not thy praise to render him happy. When thou soarest up to him, thy low desires and base inclinations shall vanish away.

Praise him when the sun rises from its ruddy bed ; praise him when it sinks down into the same ; to the voice of universal nature let thy voice be at all times united.

Praise him in the rainy and dry seasons : in the tempest, and in the fair weather : when it snows ; when the ice renders the rivers passable, and when the earth is covered with verdure !



OCTOBER.



OCTOBER I.

A HYMN TO THE PRAISE OF GOD.

ALL the heavenly hosts glorify the power and majesty of the Creator ; and all the spheres which roll in the immensity of space, celebrate the wisdom of his works. The sea, the mountains, the forests, and the deeps, which a single act of his will has created, are the heralds of his love, and declare his power.

Shall I alone be silent ? Shall I not chant a hymn to his praise ?—My soul longs to soar up to his throne ; and if my language be imperfect, let my tears express the love I feel to my Father and my Friend.

Yes, my tongue is that of a stammerer ; but let the Most High see, that the holiest flame burns on the altar of my heart. But how shall I praise **THEE** ? Could I take the beams of the sun for my pencil, I could not sketch a single ray of thy essence : the purest spirits can offer thee but imperfect praise.

By what power is it that millions of suns shine with so much splendour ? Who has traced out the wonderful course of those rolling spheres ? By what bond are they connected ? By what power are they influenced ? It is by thy breath, O Jehovah ! It is by thy almighty word.

All proceeds from thee. Thou didst speak, and worlds sprang into existence : then was our globe produced. The birds and fish, the cattle, and the wild beasts which sport in the forests ; and, finally, man himself came to inhabit it, and rejoice in thy works.

Hymn to the praise of God.

Thou cheerest our sight with delightful and variegated prospects ; our eyes wander over the green field ; or contemplate the forest which seems to touch the clouds ; sometimes they view the sparkling dew-drops, with which thou waterest the flowers ; or follow the windings of the limpid stream, in which the trees are reflected.

In order to break the violence of the winds ; and at the same time to afford us the most enchanting prospects, the mountains arise, and from them the wholesome springs proceed. Thou waterest the dry valleys with rain and dew : thou coolest the air with the gentle breeze.

It is through thee that the hand of spring spreads the green carpet under our feet : it is thou who gildest the ears of corn ; and tingeest the grape with its purple hue ; and when the cold comes to benumb nature, thou wrappest her up in a glittering veil.

By thee the human mind penetrates even to the starry heavens ; by thee man knows the past, and can discern truth from falsehood, the appearance from the reality : by thee he judges, desires, or fears : by thee he conquers death, and escapes from the tomb.

Lord ! My tongue shall rehearse thy mighty acts : only disdain not the praises of him who, before thee, is but a feeble worm. Thou who readest my heart, deign to accept the emotions which it feels, and the gratitude which it is unable to express.

When thy mercy shall encompass my head with an immortal crown, and I shall be presented faultless before the presence of thy glory, then shall I exalt thy majesty with praises more sublime. O happy moment ! long desired, and ardently wished for, hasten thy appearance ! Then shall joy, without any mixture of sorrow, for ever overflow my heart !

OCTOBER II.

THE EFFECTS OF FIRE.

NOTHING in nature can exceed the violence of fire : and we cannot, without astonishment, reflect on the effects which it produces in all bodies, and the extreme activity of its particles. But how few attend to these effects, or judge them worthy of their observation ? In all our domestic affairs, we daily feel the beneficial influence of fire ; and perhaps this is the reason that we commonly pay so little attention to it. It is my duty, however, to put the reader in mind of this divine benefit, and cause him, if possible, to feel all its worth.

One effect of fire, which falls under every person's notice, is that of *dilating* the bodies which it penetrates. A piece of iron, fitted to a hole in a metal plate, so that it may easily pass through when cold, will not enter when hot ; but let it cool, and it passes through as easily as before.

This dilation produced by fire, is still more sensible in fluid bodies ; particularly in wine, beer, and air : were it not for this, the

Effects of fire.

thermometer, by which we measure the different degrees of heat, would be entirely useless.

Observe the effect of fire on compact inanimate bodies : how soon do they melt and are changed, partly into a fluid, and partly into a solid of a different sort ! It communicates fluidity to ice, oil, and all fat substances, and to metals in general. What renders these bodies susceptible of this change is, that their combination is more simple, and that the particles of which they are composed, are more homogeneous than those of other bodies. The fire penetrates their pores more easily, and succeeds sooner in separating the parts from each other. Hence it is, that some of these matters evaporate, when the fire penetrates them in too great a quantity, and with too much violence. Some solid bodies undergo other changes : sand, flint, slate, quartz, and spar, *vitrify* in the fire : clay is changed by it into *stone* ; marble, calcareous stones, and chalk, are turned into *lime*. These different effects do not proceed from the fire, but from the different properties of those bodies on which it acts. It may produce three different effects on the same body, viz. melt, vitrify, and reduce it into lime : provided the body be composed of three different matters : the one *metallic*, the other *vitrifiable*, and the third *calcareous*. But fire by itself produces no *new substance* ; it only discovers those parts which were before hidden in the bodies on which it acts.

As to *fluids*, fire produces two effects on them : it causes them to *boil*, and reduces them to *vapour*. These vapours are formed of the most subtile particles of those bodies united to particles of fire. Hence it is that the vapours ascend, because they are lighter than air.

As to *animals*, fire produces, through all parts of their bodies, the sensation of warmth. Without this element the life of man could not be preserved ; for a portion of fire is requisite in the blood to keep it in motion. In order to preserve this motion and warmth, we every moment imbibe a portion of fresh air, to which fire is ever united : while, on the other hand, we expel the air which, having remained some time in our lungs, had lost its elasticity, and was loaded with superfluous humours.

All these reflections should confirm us in this important truth, that God refers every thing to the welfare of mankind : and that he constantly places proofs of his love every where before our eyes. How many advantages accrue to us from the effects of fire only ? By the union of fire and air the seasons are renewed ; the moisture of the soil, and the health of men preserved. By means of fire, water is put in motion ; and without this it would speedily lose its fluidity. By its gentle action in all organized bodies, it brings them gradually to their complete perfection. It preserves the branch in the bud ; the plant in the seed ; and the embryo in the egg. It prepares our food properly : it contributes much to the formation of metals, and renders them fit for use. Finally : when we collect the various properties of fire, we may see that through it the Creator has dispersed

a multitude of blessings over the whole globe : a truth which ought to be deeply impressed on our hearts ; and excite us to love the Author of our being ; and inspire us with contentment. The more we search into the nature of things, the more we shall see that all concur to the accomplishment of the most perfect end. Every where we may observe magnificent plans ; a wonderful order, connexion, and constant harmony between the *parts* and the *whole* ; the *means* and the *end*. To be convinced of this requires no extraordinary exertions of mind : let us only contemplate nature quietly ; and by the aid of our senses, we shall, in most cases, be fully assured that all the works of God are full of wisdom and goodness.

OCTOBER III.

THE INSTINCT AND INDUSTRY OF BIRDS.

BIRDS have already afforded us many innocent pleasures. Now that a great part of these sprightly inhabitants of the air have disappeared, and will not return for a considerable time, let us once more reflect upon them ; and let the subject excite us to meditate, with the most lively sentiments of gratitude and joy, on their Creator and ours. We may find great pleasure in considering the different instincts which God has given to birds. None of these instincts is superfluous, or useless ; each is indispensably necessary to the preservation and wellbeing of the animal ; and the little we know of this subject is sufficient to give us the most exalted idea of the wisdom and goodness of God.

In the first place, when we reflect on the instinct which leads birds to move ; we may find, in that alone, a just subject of admiration. Experience may convince us that bodily motions require more than strength and well-formed pliant limbs. It is not till after many trials and falls that we are able to balance ourselves ; to walk with ease, to run, leap, rise up, and sit down : and yet these motions seem more easy to bodies constructed like ours, than to birds. These animals also have two feet ; but their bodies do not rest perpendicularly on them, they project both before and behind ; and yet a chick will stand straight, and run about almost as soon as it is out of the shell. Young ducks, just hatched by a hen, know their own element, and swim about in the water without example or instruction. Other birds know how to rise up from their nests into the air, balance themselves, pursue their course, making equal strokes with their wings in true time ; stretch out their feet to balance their body ; use their tail like an oar, or rudder, to direct their flight ; and make long journeys from their native country to unknown regions.

They also provide their food with admirable art : an art which they bring into the world with them. Some birds, though not aquatic, live on fish : they must necessarily find it more difficult to seize

 Instinct and industry of birds.

their prey than water-fowl. Who teaches them their natural instinct in this case? They stand on the brink of the strange element, and when a shoal of fish comes (which they can discover at a distance) they pursue them, skim along the surface, and suddenly dive into the water, and carry off a fish. Who gave the birds of prey their piercing sight, courage, and the weapons, without which they could not possibly subsist? Who points out to the *stork* the place where she may find frogs and insects to feed on? In order to find them, she must seek them not only in the meadows, but also in the furrows of the field; she must continue her search till near the morning, when the other birds awake. What incredible strength must the *condour* have, seeing it can carry away a sheep, or a deer, and prey upon an ox! How can we reconcile with the wild nature of the *quail*, (a characteristic which no education can entirely correct,) that maternal instinct which causes her to adopt little birds of every species, which she not only takes under her protection, but bestows on them the tenderest cares! What cunning does the *crow* use to secure the prey which she cannot devour at once? She hides it in places such as other crows do not frequent: and when she is hungry again, how well does she know the magazine where she has laid it up!

We might spend many years in multiplying observations of this kind; without being able to explain the principal mysteries contained in the instinct of birds. But even the little we do know of this subject may tend, in a most pleasing manner, to engage those whose hearts are disposed to contemplate the works of nature, and to exalt them to still more noble pursuits. To this point I wish to conduct the reader. Let none be contented with barely considering the instinct and faculties of birds: this should be only the first step to sublimer meditations. Let our admiration of these faculties raise our hearts to that God from whom *they* have received them: and who has prepared and combined so many things for the subsistence and multiplication of this part of his creatures. Let us not say that *nature* teaches these birds this art, or that industry which surprises us so much: if you separate nature from its Author, it is then a word destitute of meaning. Let us rather glorify the Creator, and acknowledge that it is HE alone who gives wisdom even to the fowls of the air.

 OCTOBER IV.

ANIMAL REPRODUCTIONS.

HERE we discover a new scene of wonders which seem totally to contradict the principles which have been adopted relative to the formation of organic bodies. It has long been thought, that animals could only be multiplied either by eggs or young ones; but this principle must be admitted with some caution: as it is still liable to

Animal reproductions.

several exceptions. It is now found that there are some animal bodies which may be divided into as many complete bodies as we please ; for each part will speedily repair what is deficient, in order to make a complete animal, after having been separated from its original. It is now no longer doubted, that the *polypus* belongs to the class of animals ; although it resembles plants, not only in its form, but also in the mode of its propagation. The bodies of these zoophytes may be cut, either across or lengthwise, and these bits will become so many complete *polypes* : even from the skin, or smallest bits cut off, there will grow one or more of these animals. And if several bits cut off be put together at the ends, they will reunite so perfectly, and nourish each other, that they soon become one and the same body. This discovery has given rise to other experiments, which have proved that *polypes* are not the only animals which can live and grow after being cut in pieces.

The common *earthworm* will multiply after being cut in two. To the tail part there grows a head, and the two parts then become two complete worms. After having cut the worm in two, it would be in vain to attempt to unite the parts : they will never join. They remain for some time in the same state, only grow a little smaller : afterwards, at the cut extremity, a little whitish button begins to appear, which grows larger, and then lengthens by degrees. Shortly after rings appear, which are at first very close together, but extend insensibly on all sides. It then forms itself new lungs, a new heart, a new stomach, and with these several other organs.

The following experiment may be made daily with *snails*. Cut off their heads close to their horns, and in a certain space this head will be reproduced.

A similar change takes place in *crabs* : break off one of their claws, and put the animal again into its element, and in some time the claw will be entirely reproduced.

Another very wonderful experiment has been made by Mr. *Dumahel*, on the thigh of a *chicken*. After the thigh-bone, which had been broken, was perfectly restored, so that a callus was completely formed, he cut off all the flesh even to the bone ; the parts were gradually reproduced, and the circulation entirely restored !

We are convinced then that some animals are perpetuated by being divided : and we cannot doubt, that the young of certain insects may be produced in the same way as a branch is from the tree : that they may be cut in pieces, and the smallest piece become a complete animal : that they may be turned inside out like a glove, cut in pieces, and then turned again ; and nevertheless still eat, live, grow, and propagate ! Here a question arises, which no naturalist can answer in a satisfactory manner : how can these parts, thus cut off, be again reproduced ? It must be taken for granted, in this case, that germs are spread through every part of the body ; while, in other cases, they are confined to one part. These germs unfold themselves, when they meet with proper nourishment : thus, in cutting

 Animal reproductions.

one of these animals, the germ is furnished with the requisite juices, which would have been conducted elsewhere, had not their course been thus interrupted. The superfluous juices cause those parts to unfold themselves, which without this would have continued attached to each other. Every part of the polype, and the worm, contains in itself all the viscera necessary to the animal ; as the bud does all the rudiments of the tree. These parts, essential to life, are dispersed over all the body, and the circulation is carried on even in the smallest parts.

As we cannot comprehend all the means which the Author of nature may make use of to distribute life and feeling through such a prodigious multitude of beings ; so we must not assert that the animals already mentioned are the only ones which, in reference to their mode of propagating, are exceptions to the general rule. The fecundity of nature, or rather the infinite wisdom of the Creator, must ever surpass our weak conceptions. The hand that has formed the *polypus* and the *earthworm*, has showed us that it can, when necessary, simplify the animal constitution. It has simplified them more still, and descending always by insensible gradations, has arrived at the utmost limits of animal nature : but of these utmost limits we are ignorant : let us feel a deep conviction of this ignorance, and admire and adore the Supreme Wisdom. It is never more sublime than in those cases in which it is impossible for us to discover its footsteps.

These animal reproductions should remind us of the great change which shall take place in the day of the resurrection. What we see now in miniature, will be then manifested in magnitude. What we now observe in other bodies, we shall then experience in our own, from the smallest particles a body will spring up fitted for the enjoyment of an eternal felicity.

 OCTOBER V.

THE ORGANS OF TASTE.

WE should not be so happy as we really are, if we had not the faculty of distinguishing different kinds of meat and drink by *tasting*. The great variety of fruit, at this season, may naturally lead us to reflect on this subject. Our pleasure would be greatly diminished, if the *pear*, the *apple*, the *plum*, and the *grape*, had all the same flavour. The power to distinguish them, or, in other words, the sense of *taste*, is a gift of God's goodness, and a proof of his wisdom, on which we should reflect with gratitude to our Creator.

But by what means do we *taste*, and distinguish our food ? The *tongue* is the principal organ : and, that it may answer this end, its surface is covered with nervous papillæ, by means of which we distinguish the flavour of the salts which dissolve on the tongue. *Tasting*, therefore, depends on the nerves ; and this is clearly seen in dissecting the tongue ; for, after the membrane which covers it is

The organs of taste.

taken off, a multitude of roots, where the nerves terminate, appear; and these are the nervous papillæ that give us the sensation of *taste*: and where these are not, the sensation is wanting.

When we put highly flavoured things under the tongue, we are scarcely sensible of it till they are attenuated; and till we bring them on its surface; then we distinguish their flavour: consequently the sensation of taste is in its full force only where the nervous papillæ are most numerous; and this is the part nearest to the throat. To be further convinced that tasting is occasioned by the nerves, we need only examine the tongue of a dog, or a cat. On their tongue the nervous papillæ are situated towards the root; the forepart is destitute; but the palate is covered with them; hence it is that these animals have no sensation of taste in the tip of their tongue.

Let us continue our reflections for a few moments longer on this subject. How ingeniously is this organ of taste formed: all the parts of which no anatomist has yet been able to find out! Is it not a proof of great wisdom, that the tongue should have more nerves and fibres in proportion than any other part of the body; and that it should be full of small pores, that salts, and all savoury particles, should penetrate deeper, and in greater quantity, into the nervous papillæ? Is it not a proof of the same wisdom, that the branches of the nerves which are spread over the palate and throat to assist mastication, should extend their branches towards the nose and eyes, as if to inform the organs of sight and smelling that they should contribute their part toward the discernment of food? Another thing worthy of admiration is, the duration of the organs of taste. Notwithstanding the delicacy of their structure, they last longer than instruments of stone or steel. Our clothes wear out, our flesh fades, our very bones dry up; but the sense of taste survives them all. What admirable designs may we discover even in the apparatus of these organs! O man, thou art the only creature that knows he is endowed with senses; and the only one capable of raising himself towards God by the contemplation and use of these organs.

Strenuously endeavour, by the assistance of Divine grace, to make a proper use of these faculties. If *thou* wilt not acknowledge the goodness of thy Creator, who shall render him that homage? Thou enjoyest more through the sense of taste than any other creature: for the animals have but few things on which they like to feed; but thy Creator has prepared for thee meats and drinks as various as they are abundant. Reflect on the abundance which the animal, vegetable, and mineral kingdoms, provide for thee. "Heaven and earth, air and ocean, pay thee tribute. Wheresoever thou turnest, thou mayest behold the gifts of God. The tops of the mountains, the bottom of the valleys, and the beds of lakes and rivers, furnish thee with aliments and pleasures."

It is reasonable that we should highly esteem this gift of our Creator; but let us not esteem it beyond the design of the donor. The sense of taste is given us to be the means of accomplishing a noble

The organs of taste.

end. How indescribably foolish would it be to make the whole of our happiness consist in those pleasures of which this sense is the organ ; and to live only to please the palate with savoury meats and delicious drinks ! Let us take care not to bring ourselves to a level with the brute, whose principal happiness consists in eating and drinking. Let us remember that we have an immortal soul, which cannot be satisfied but by the Supreme Good. To have a true taste for this good, earnestly to desire to be nourished by it, is that wherein the wisdom and true felicity of the man and the Christian consist.

OCTOBER VI.

THE GOVERNMENT OF GOD WITH RESPECT TO NATURAL EVENTS.

ALL the events which take place in the sky, on the earth, in the sea, and in the air, are regulated according to prescribed natural laws. But it would be foolish not to acknowledge a particular influence of God, which directs natural things according to his own views ; and causes them to concur in accomplishing his own designs. He makes use of natural causes to chastise mankind ; and thus, at his command, the air is pure or corrupt, the seasons fruitful or unproductive. He prevents or assists the designs of men ; sometimes by winds and storms ; and sometimes by the flux and reflux of the sea. It is true, that God does not in general interrupt the course of nature ; but it is equally true, that nature cannot act without his energy and concurrence. The parts of which the visible world is composed cannot use their power as they please ; and God can influence his creatures without reversing the order of nature. Fire, water, wind, and rain, have their natural and particular causes, and particular virtues : but God uses them in a manner suitable to their nature, to execute his designs. He makes use of the heat of the sun to warm the earth, and render it fruitful. He employs the rain and the wind to purify and cool the air, but it is always in such a way, and in such a degree, as best consists with his own views.

A great part of these blessings and evils which we experience here below, proceed from surrounding objects ; but as God interests himself in all that happens to man, he must of course influence these objects, and act through every part of nature. On this are founded the rewards and punishments of virtue and vice. Peace and prosperity crown the one : and when he pleases, famine and pestilence scourge the other. In a word, all natural causes are in the hand of God, and immediately under the guidance of his providence. Men themselves furnish proofs of this. How often does their industry triumph over nature ! They cannot indeed change the essence of things ; but they know how to use natural causes so that effects may result from them, which would never have taken place had it not been for the art and direction of man. Now, if the Most High has, in some

measure, subjected natural things to human industry, with how much more reason may he reserve to himself the direction and government of all these things ?

From all this we may conclude, how necessary it is that a particular providence should watch over the government of the world. Natural causes are doubtless excellent instruments : but in order that they may be useful, they must be put into the hands of a skilful workman. It would be an unreasonable wish that God would change the established laws of nature : for instance, if we should fall at any time into the fire or into the water ; that we should not be burnt by the one, nor drowned in the other. Nor is Divine Providence obliged to preserve us, when we shorten our lives by our own intemperance ; for it is not to be expected that God will work miracles to save men from those evils which they bring upon themselves by their irregularity and misconduct. It is our duty to attribute to a particular providence all those kind dispensations which relieve our wants, and fill our hearts with joy. But all the disorders of nature are, at the same time, effects of the wrath of God, who makes use of them for the punishment of sinners. It is on this truth, that on one hand we found our prayers and supplications for the blessings of heaven, peace of conscience, and fruitful seasons ; and, on the other, our thanksgivings to God for the manifold mercies we receive from his hand.

OCTOBER VII.

THE INEXHAUSTIBLE RICHES OF NATURE.

NATURE is so liberal to us, so abundant in means to supply the wants of all creatures, so rich in gifts, that they can no more be numbered than the drops of water in the ocean.

How many things does one single man need in the course of a life of sixty years ! How much is necessary for eating, drinking, clothing ; for the sweets, conveniencies, pleasures, amusements, and duties of society ; without mentioning extraordinary cases, and unforeseen wants and accidents. From the king to the beggar, in all states, conditions, and ages in human life ; from the infant to the old man ; in all nations of the earth, and according to the different modes of life for the inhabitants ; each person has his particular wants : what suits one will not suit another, and all require different kinds of food, and means of subsistence. Notwithstanding this, we find that nature provides for all, and liberally supplies every want ; so that each individual receives all that is necessary for his support. Since the foundation of the world the earth has not failed to open her bosom ; the mines have not been exhausted ; the sea always furnishes subsistence for an infinity of creatures ; and plants and trees have always produced seeds and germs, which shoot forth and become fruitful at their proper seasons : beneficent nature varies her riches, that she may not be too

much exhausted in one place ; and when one kind of plants, fruits, and other provisions, begin to fail, she produces others, and does it in such a manner, that the desire and taste of mankind should lead them to prefer those which are most abundant.

Nature is also a wise economist, who takes care that nothing shall be lost. She knows how to turn every thing to profit. Insects serve for food to the largest animals : and those are useful to man in one way or other. If they provide him not with food, they afford him clothing, or arms and means of defence : and some which are not profitable for any of the above purposes, procure him at least useful medicines. Even when diseases diminish certain kinds of animals, nature repairs that loss by an increase of others. Even the dust, dead carcasses, putrid and corrupted matter, are all made use of by her, either for food to certain insects, or manure for the earth.

How rich also is nature in beautiful and delightful prospects ! Her most beautiful attire requires only light and colours : with these she is abundantly provided, and the appearance which she presents us, is continually varied, according to the different points of view in which they are seen. Here the eye is struck with beauteous forms ; there the ear is charmed with melodious sounds ; and the smell is regaled by exquisite perfumes. In other places art comes in to add new embellishments to nature, by a thousand labours of her industry. The gifts of nature are so abundant, that even those which are continually used never fail. She spreads her riches over all the earth : she varies her gifts according to the different countries : she gives and receives ; she establishes, by means of commerce, such relations and connexions between different countries, that her presents pass through innumerable hands, and increase in profit and value by this continual circulation. She combines and mixes her gifts, as the physician does the ingredients in his prescriptions : the great and the small, the beautiful and the homely, the old and the new, combined and properly tempered together, form one whole, equally useful and pleasant. Such, in the hands of God, are the inexhaustible riches of nature.

And what are we that we should daily enjoy these blessings ! How often has kind nature in our behalf opened her liberal hand, and shed around us her abundant gifts ! But how many spiritual blessings, infinitely more precious, fall to our lot ! *Nature* is rich, but *grace* is infinitely more so. The former can only supply our temporal necessities : the latter satisfies the wants, and enriches the poverty of our souls. The former undoubtedly provides a variety of pleasures : but to the latter we owe blessings that shall last for ever. Nature charms and invigorates our senses : grace seizes on the whole soul, and penetrates it with ineffable joy. May we know and feel that we owe our all to the goodness of God ! May all the blessings with which he loads us from the kingdom of nature, and the kingdom of grace, kindle our love more and more, and perfect our confidence in him ! “ What ! Shall *we* not glorify so good a God ? Shall *we* not acknowledge *his* bounty ? Shall *we* shut our ears when *he* calls ? Shall *we*

Inexhaustible riches of nature.

refuse to walk in the path which *he* has marked out? No! Let us rather meditate on the love with which he has honoured us; and let us love *him* who has first loved *us*. The Lord has never forgotten us a moment since we began to exist; and while we live may we never forget *Him*!"

OCTOBER VIII.

PETRIFICATIONS.

THE transition of different substances from the animal or vegetable kingdom into the mineral, is a peculiarity of natural history, which is well worth our attention. *Petrifications* are properly a species of medals, the explication of which casts a great deal of light on the natural history of the earth.

The first thing to be remarked in petrifications is, their external form; this proves that these fossils have indubitably appertained to the animal and vegetable kingdom. We seldom find petrifications of any part of the human body; and those of quadrupeds are nearly as scarce. The most extraordinary skeletons found in the earth are those of elephants; some of which are found even in different parts of Germany. Petrifications of aquatic animals, are frequently to be met with; sometimes whole fish are found, the smallest scales of which may be easily distinguished. But all this is nothing in comparison of the multitude of shells and worms, apparently converted into stones, in the bowels of the earth. Their number is not only prodigious, but there are so many different species, that living animals, corresponding to some of them, are entirely unknown. Petrifications of marine substances are found in great abundance in all countries. They are found even on the tops of high mountains, some thousands of feet above the level of the sea. Many are found at different depths in the earth. All sorts of plants and parts of vegetable substances, are found petrified in different strata of the earth: but these are often the impressions only, the substances themselves being entirely destroyed. In many places whole trees are found buried at different depths in the earth, apparently converted into stone; these petrifications however do not appear to be of an ancient date. But how have all these petrified substances got into the earth? And particularly how could marine substances get to the tops of such high mountains? How could animals, whose ordinary habitation is the sea, and which belong to no other element, be transported so far from their natural abode?

For this phenomenon different causes may be assigned. Probably these petrifications prove that the water has formerly covered the greater part of the earth: and indeed, as in every place we search, from the tops of mountains to the great depths of the earth, we meet with all sorts of marine substances; it seems as if it could not be ac-

Petrifactions.

counted for otherwise. The great quantity of petrified shell-fish found at considerable heights, and which form regular beds, incline us to believe that these heights made formerly a part of the bottom of the sea ; and this opinion acquires strength from this consideration, that the present bottom of the sea exactly resembles the surface of the earth. We have but a very imperfect knowledge of the manner in which nature brings about these petrifications. It is certain that no body can undergo this change in the open air ; for animal and vegetable substances consume or rot in this element : therefore the air must be excluded from the places in which these petrifications take place, or at least, its action must be suspended. Dry earth has no petrifying quality : as to running waters, they may form a crust on particular bodies ; but they cannot change them into stone. The very motion of the water prevents this. It appears, therefore, probable, that petrifications require soft moist earth, greatly impregnated with dissolved stony particles. These stony fluids penetrate the pores or cavities of animal and vegetable substances, and become consolidated as the parts of these bodies are dissipated by evaporation, or absorbed by alkaline substances.

From what has been remarked, we may draw some consequences which throw light on this phenomenon. 1. All animals and vegetables are not equally proper to become subjects of petrifications ; for in order to this they require a certain degree of firmness, which prevents their rotting before this operation is completed. 2. Petrifications are principally formed under the earth, and the place where they are formed must neither be too wet nor too dry. 3. All stones which include petrifications, or constitute the matter of them, are not original productions, but such as are daily formed : such as calcareous stones, indurated clay, compacted sand, the loadstone, and similar substances. 4. Petrified bodies are of the nature of these stones, being sometimes calcareous, sometimes like slate, &c. 5. Hence it appears, that *petrification* is not the transmutation of one body into another, but properly the substitution of one body for another ; whose appearance and form the stony particles assume, for the reason given in the first inference.

If petrifications were of no other use than merely to throw light on the natural history of our globe ; even on that account they highly deserve our attention. But we may also consider them as proofs of the operations and changes which nature works in secret ; and in this also the wonderful power and wisdom of God are particularly manifested.

Operations of nature are gradual.

OCTOBER IX.

ALL THE OPERATIONS OF NATURE ARE GRADUAL.

WE may observe an admirable gradation in nature ; or an insensible progress from the most simple to the most complex perfection. Therefore there is no intermediate space which has not some characteristic of what precedes and what follows. In a word, there is neither a void nor a break in nature.

Dust and earth are the principle and matter of the composition of all solid bodies. Therefore these are found in all bodies decomposed by human art. From the union of earth with *salts, oils, sulphurs, &c.* result different kinds of earths more or less compound, light, or compact. These lead us insensibly to the *mineral kingdom*. There are a great variety of *stones* ; and their form, colour, size, and hardness, are very different. In them we find all sorts of saline and metallic particles ; whence minerals and precious stones proceed. In the latter class of stones some are found which are fibrous, and have laminæ, or a kind of leaves, as *slate, talc, lythophytes*, or stony marine plants ; the *amianthus*, or stony-flower of mines ; and these lead us from the mineral to the vegetable kingdom. The plant which appears to occupy the lowest part of vegetable gradation is the *truffle*. Next come the numerous species of *mushrooms* and *mosses*, between which, *mould* on paste, &c. seems to form the connecting medium. All these plants are imperfect, and properly only constitute the limits of the vegetable kingdom. The most perfect plants are divided into three grand families, which are distributed over the earth, viz. *herbs, shrubs, trees*.

The *polypus* seems to unite the vegetable and animal kingdoms. From its outward appearance this singular production might be taken for nothing more than a mere plant, were it not seen to perform real animal functions. This *zoophyte* seems to form the connecting link between plants and animals. *Worms*, which are at the commencement of the animal kingdom, lead us to *insects*. Those worms whose bodies are enclosed in a stony or scaly shell, seem to unite *insects* and *shell-fish*. Between them, or rather next to them, are found reptiles ; these, by means of the *water-snake*, are united to *fish*. The *flying-fish* leads to the *fowls*. The *ostrich*, whose feet very nearly resemble those of the *goat*, and who runs rather than flies, seems to connect *birds* with *quadrupeds*. And the *ape* joins hands with *quadrupeds* and *men*.

There are gradations in human nature, as well as in all other things. Between the most perfect man and ape, there are an astonishing multitude of links. And how many must there be between the most perfect man and the lowest angel : and how many more still between the highest archangel and the Creator of all things ! Here new gradations become evident ; new plants, new beauties, and new perfections ! But the gradations in the spiritual world are hidden from us by an impenetrable veil. However, for our comfort, we under-

Operations of nature are gradual.

stand, from revelation, the immense space between God and the cherubim is filled by Christ, who is God manifested in the flesh. By him human nature is exalted and glorified : by him we are raised to the first rank of created beings ; and have liberty to approach the throne of the Supreme God.

Let us reflect on these gradations of nature : the little that has been said may suffice to show us, that every being is intimately blended in its beginnings and endings with others ; and that the whole universe is linked together in all its parts. There is nothing in it without design : nothing but what is an immediate effect from a preceding cause ; or which does not determine the existence of something that is to follow. Nature proceeds not by *leaps* : all goes on *gradually* ; from the component to the composed ; from the least to the most perfect ; from the nearest to that which is furthest off ; from inanimate to animate ; from corporeal to spiritual perfection. But how imperfect still is our knowledge of this immense chain of beings ! We have only a glimpse of this gradation ; know but a few of its boundaries, and some ill-connected, broken links of the great chain.

And yet, defective as our knowledge is in this respect, it is nevertheless sufficient to give us the highest idea of this admirable series, and infinite diversity of beings which constitute the universe. And all leads us to that Infinite Being, between whom and us there is a distance which no understanding can measure. He is the only being who is beyond all the links of the chain of nature. From the grain of sand to the seraphim, every being owes its existence to him. Let us often endeavour to ascend to him on the ladder of his creatures. From the dust out of which we were formed, let us, on the wings of devotion, soar to that God who is the first of beings ; the infinite, the incomprehensible Jehovah ! Let us long for the time in which we shall be introduced into the blessed assembly of glorified spirits ; where the universe shall be unveiled before us, and where we shall know God as we have been known. While we live here below, we go on to perfection by insensible gradations. We proceed from ignorance to wisdom and understanding ; from corporeal to spiritual ; from weakness to spiritual strength. “ Our life is only beginning ; it is only in its dawn : let us expect a greater light.—Let us not murmur against Him, who wills that we should sojourn here awhile in dust and darkness : he loves that dust which he has formed ; and if found faithful, will one day raise us to the most exalted degrees of glory.”

OCTOBER X.

THE FALL OF THE LEAF.

WE already begin to see the ravages which the approach of winter makes in the forests, and in the gardens. All plants, a very few excepted, lose their leaves, which are one of their principal ornaments.

The fall of the leaf.

But what can the cause of this be? That which seems the most natural is, the cold: for as soon as the first frost sets in, the leaves fall in abundance, and the vegetables are soon spoiled of their dress. This indeed cannot be otherwise, seeing the cold causes a stagnation of the sap in plants, and prevents the leaves from perspiring. But cold is not the only cause of their fall; for this happens even in those winters when there is no frost; and to those trees which are kept in green houses to preserve them from the cold: it is probable, therefore, that other causes concur to strip the trees of their leaves; perhaps they wither because the root no longer furnishes sufficient sap for their perspiration: for it is evident that the branches increase for some time in thickness, when they cease to grow in length. When therefore the branches continue to grow thick, and the stalks of the leaves do not increase, their fibres must be necessarily detached from the fibres of the branches, and then the leaves must fall of course.

But we must not suppose that these fallen leaves are entirely lost, and of no manner of use. Both reason and experience declare the contrary. Nothing is useless in the world: nothing perishes; and consequently the leaves which fall from plants and trees have their use; they rot and become manure for the earth. Snow and rain separate the salts from them, and convey them to the roots of the trees. Further, where the fallen leaves are strewed on the ground, they preserve the roots of young plants, become a covering for seeds, and keep up a proper degree of humidity and warmth. This is particularly the case in respect to the leaves of the oak. They furnish an excellent manure, not only to the tree itself, but also to the young shoots; and they are very useful for forest pasturages, as they favour the growth of the grass, which they cover, and on which they rot. These advantages are so important, that fallen leaves are seldom collected to make dunghills of, unless they have fallen in such abundance as rather to choak the grass than to nourish it.

Leaves may serve for manure in various ways. They are spread in stables instead of straw: and they make a very good litter for cattle; and sometimes they are mixed with other kinds of manure. The mould they produce is very useful in gardens, where layers are made of it, which contribute much to the growth of fruits and young trees.

But it may be said, that the fall of the leaf is peculiarly destructive to a multitude of insects, which live on the leaves of plants and trees. It is true, that autumn sweeps away whole swarms of insects, with their nests: but does it follow hence that these creatures perish? Why may they not live even on the ground, under these very leaves which cover and protect them from the cold?

The *fall of the leaf*, is an emblem, not only of life, but of the frailty of all earthly things. "*I am as a falling leaf; death walks by my side: to-day I may wither; and to-morrow be converted into dust.*"

The fall of the leaf.

I hang by a thread, and may be deprived of all my beauty and vigour in a moment. A little cold air may put a period to my life ; and my body be turned into earth. But if we leave behind us the well-ripened fruits of righteousness, love, and holiness ; we shall die honourably, and may leave this world without regret.

OCTOBER XI.

DIFFERENT KINDS OF EARTH.

WE can only form conjecture concerning the inside of the earth. Those who work in mines have not been able to go lower than 900 feet. Were they to attempt to go further, the great pressure of the air would kill them ; supposing even that they could protect themselves from the water, which increases in proportion as we descend. But what is the depth of 900 feet in comparison of the semi-diameter of the earth, which is 3982 miles ? The inside of the earth must consequently be in a great measure unknown to us. Miners themselves have scarcely as yet penetrated through its first crust. All that we know is, that after we have dug some hundreds of feet in depth, this upper crust is found to be composed of different *strata*, or beds placed one on the top of the other. These strata or layers are very much mixed, and their direction, matter, thickness, and relative position vary considerably in different places.

Generally under common earth, in gardens, clay and fat earth are found : and sometimes alternate layers of clay, sand, and marle.

The manner in which these different strata of earth are classed is quite arbitrary : they may be less or more extended ; but in comparing the accounts given by different writers, the following appears to be the best ; and this divides earth into *seven* different classes.

1. *Black earth* : this is composed of putrified vegetable and animal substances. It contains many salts, and much inflammable matter. This is what is commonly called *dung*.

2. *Clay* ; this is more compact than black earth, and retains water longer on its surface.

3. *Sandy earth* : this is hard, light, and dry ; it neither retains water, nor is dissolved in it. It is the worse kind of earth, though some kinds of plants may grow in it.

4. *Marle* : this is softer, more mealy, less hard, and attracts moisture better.

5. *Bog, or moss earth* : this contains a vitriolic salt, which is too acid for plants.

6. *Chalk* : this is dry, hard, and brittle : notwithstanding a few plants can thrive in it, and

7. *Scabrous or stony earth*. The smoothest stones, however bare of earth, are at least covered with moss, which is a mere vegetable

Different kinds of earth.

production : and birch is known to grow between stones, and in the clefts of rocks, and grows also to a considerable height.

The Creator has most wisely arranged these different kinds of earths, of which the *strata* are composed. For, to mention only the principal advantages which result from them ; these different layers of sand, gravel, and light earth, give an easy passage to fresh water, which is filtered in passing through these different beds, becomes soft, and is afterward distributed on all hands for the supply of men and animals. These *strata* are also the reservoirs and canals of springs and fountains. And it is remarkable, that such canals are found in every country over the whole globe : and that they are in general composed of light earth. If it be sometimes mixed with a more harsh and gravelly soil, the water is consequently still better purified. This variety of soils is of great utility in the vegetable kingdom : for it is owing to this that herbs, plants, and trees, grow of themselves in certain countries ; while in others they cannot be produced without the assistance of art. All that art can do is to imitate nature ; which prepares and proportions to plants, which grow of themselves, the soil, nutritious juices, and warmth which are necessary to their vegetation. This same variety of soils, is the cause why certain herbs, roots, and trees, have their internal structure different from those of the same species which grow on other soils. It often happens, that some plants thrive while others languish in the same soil. The same fruits have a different flavour in some countries, from what they have in others. Plants whose roots are weak, small, and delicate, and which have but little sap, should be sown and planted in a sandy, light soil, that the roots may extend themselves without meeting with too much resistance ; a soil into which the rain may easily penetrate, and where the roots may not meet with too many saline, acid, or oleaginous particles.

It is asserted, that in the space of forty-eight hours, lettuce, cauliflower, sallads, &c. may be produced fit to eat, if the seed be first steeped in brandy, and the ground in which they are sowed mixed with pigeon's dung, and powder of slack lime. A proper preparation of the soil is indispensably necessary for vegetation.

What has been said should induce us to acknowledge with what wisdom the Creator has disposed each soil for the production of plants, and for the benefit of his creatures. It would therefore be very unjust to complain of the sterility of such and such soils : for the Creator has ever taken care that the different countries which he has assigned for the residence of man, should produce every thing necessary for his subsistence. If there be any soils which appear less fertile than others, the Creator has compensated that defect by greater advantages ; or he has given the inhabitants of such places, greater skill and ability for labour.

OCTOBER XII.

WINE.

WINE is a gift of the Divine Goodness ; and should excite our admiration and gratitude. It might have been thought sufficient that God had given us bread, and other aliments necessary for our support, in abundance : but he has not confined himself to this ; he has provided also for our comfort and pleasure : therefore, to render our lives still more comfortable, and to confirm and preserve our health, he has created the vine.

Other beverages, whether natural or artificial, do not produce these effects in the same degree. Wine alone has the power of banishing sadness, and of inspiring that cheerfulness which is equally necessary to the wellbeing of our bodies and minds. Its spirituous parts speedily recruit our exhausted strength. Bread strengthens man for labour, but wine enables him to act with *courage*, and renders his labour pleasant. Spirituous liquors produced by art, cannot diffuse over the countenance that air of cheerfulness which wine gives it. And here let us reflect on God, who has communicated to this salutary juice qualities so superior to the baseness of its origin, and the sterility of its native soil. The Creator has produced these effects by the mixture of oily, saline, and volatile particles ; of which all wines are composed.

But how greatly is the Divine goodness manifested in the abundance and variety of wines. Their different kinds are innumerable. They vary in colour, smell, taste, quality, and duration. We might almost say, that there are nearly as many different kinds of wine, as there are soils ; for the Creator has assigned to each country such wines as are best adapted to the climates, the constitution, and mode of life of the inhabitants.

But how blameably have men acted in reference to the use of wine ! There have been some legislators, who have severely prohibited the use of it ; and this not by considerations drawn from the health and manners of the people, but for false reasons of economy, and sometimes merely from fanaticism. It is at least certain, that to these causes united we must attribute Mohammed's prohibition of this liquor. This objection to wine is the more unreasonable, as the greater part of the people who prohibit the use of the liquor, permit the eating of grapes.

Another fault of which men are guilty is, the *adulteration* of wines ; especially that which is made by *lime*, *white-lead*, *litharge*, and other noxious ingredients. In this the human heart discovers itself in all its deformity and sinfulness : can there be any thing much more detestable ? A poor sick man endeavours to assuage his sufferings, and recruit his exhausted strength by a little wine, which he purchases by a part of his scanty earnings : and they who adulterate this article have the barbarity to increase his sufferings, and render him

 Wine.

more miserable, by presenting him with a poisoned cup, from which the unfortunate person drinks death instead of the life and strength he expected! But a still more shameful and deplorable abuse of it is, that some men, by an immoderate use of it, poison themselves. This liquor is a wholesome remedy: it supports animal life, and contains vital spirits which warm and animate the humours, and increase and establish the strength. But its continual and excessive use prevents all these good effects. Thus used, it is to the human body what so much manure is to the garden; it hastens the fruit, but destroys the tree. A wise gardener will not continually manure and enrich his ground; he does this only in proper measures, and in proper times. He manures the trees when it is necessary, and gives them that portion only which their wants and nature require. This is the proper regimen for wine; he who does not attend to it will ruin both his body and soul.

Let us profit by these counsels, and never use wine without reflection; nor for the mere pleasure of drinking. Let us ever remember, that without the Divine blessing, the most necessary aliments would fail: that it is our heavenly Father who gives this wholesome fluid to strengthen and refresh us; and that without his blessing, wine itself would become a poison and principle of death. We should seriously attend to these things, and think on the account we must give to God for the use we have made of the aliments which his divine goodness has granted us; we should therefore take care that we abuse none of them; but make such a moderate use of wine, and every other blessing, that our health may not be injured, nor our understanding disturbed; that we may never be found incapable of performing the duties which Christianity, and our secular business, require of us. We shall not then seek our happiness in wine: but, on the contrary, rather abstain from it, or any other gratification, at particular seasons, that we may save something for the poor and the distressed. Thus the aliments which God condescends to give us, will excite our gratitude and love more and more to the Dispenser of all good: we should use them only that we may be the more fit to serve God with zeal and fervour; and fill up the duties of our respective callings. And we should remember particularly that these divine gifts, however excellent, are the least of those which God's grace is unceasingly dispensing: and that blessings and pleasures, infinitely more perfect, are reserved for the righteous in the world to come.

 OCTOBER XIII.

THE MIGRATION OF BIRDS.

THIS is the time when most of those birds which, in summer, found habitations and food in our fields, gardens, and forests, are about to leave our climate and pass into other countries. Very few spend the

Migration of birds.

winter with us : the *yellowhammer*, the *chaffinch*, the *crow*, the *raven*, the *sparrow*, the *wren*, the *partridge*, the *robin*, and the *fieldfare*, are the principal. Most of the rest hide themselves, or leave us entirely. This migration is wonderful in every point of view : if then we have not sufficiently considered these creatures during their stay with us, we should at least pay some attention to them now, when taking their leave. Perhaps this may lead us to consider them more particularly when they return in the spring.

Some kinds of birds, without taking any high flight, or setting off in troops, draw gradually towards the south, to seek those seeds and fruits which they like best ; but they speedily return. Others, which are termed *birds of passage*, collect at certain seasons, and fly off in large flocks to other climates. Some others are content to pass from one country to another at certain times, attracted by the air and food. Others pass the seas, and undertake voyages of a surprising length. The best known birds of passage are, the *quail*, the *swallow*, the *wild duck*, the *plover*, the *snipe*, and the *crane*, with some others which live on worms. In spring the *cranes* pass from Africa into Europe, in order to enjoy a moderate warmth. They come in flocks often like clouds : and sometimes being nearly spent, they alight on vessels, and are taken without any difficulty. Swallows act in a different way : many cross the seas, and many continue in Europe, and hide themselves in holes of the earth, or in marshes, fastening themselves together, claw against claw, and beak against beak. They pile themselves in heaps in such places as are unfrequented by men and beasts. *Wild-ducks* and *cranes* also go at the approach of winter to seek milder climates. They all assemble on a certain day, and set off in a flock. They commonly arrange themselves in two lines, united in one point like a *wedge*, or an inverted Δ , with a bird at the head, and others following in two lines, more and more extended. The *duck*, or *crane*, which forms the point, cuts the air, and renders the passage easier to those that follow, whose beaks always rest on the tails of those before. The leader is charged with this commission only for a time : he passes from the head to the tail, rests himself, and is replaced by another. But all birds of passage do not go in flocks ; there are some which travel alone ; others with their females and young ; and others in small flocks. They perform their journey in a very short time. It has been computed that they may easily go 200 miles in six hours each day, supposing they can take rest at intervals, or during the night. According to this calculation, they may pass from our climates to the equinoctial line in seven or eight days ! This conjecture has been verified, as swallows have been seen on the coasts of Senegal on the 9th of October ; i. e. eight or nine days after they left Europe.

These migrations cannot be too much admired. Doubtless the difference of heat and cold, and want of food, warns them to change their abode. But how comes it, when the air is so mild, that they might still remain with us, and their food is still found in sufficient quantity, that they never fail to set off at the appointed time ? How

Migration of birds.

do they know that they shall find, in other climates, the necessary food and warmth? How is it that they all take their departure from us at the same time, as if they had beforehand unanimously fixed the day of their journey? How can they, notwithstanding the darkness of the nights, and their ignorance of the road and the countries to which they go, still hold on a direct course? These, and other questions on this interesting subject, are very embarrassing; and hitherto have received no satisfactory answer; probably, because we do not sufficiently know the instinct and nature of those creatures. However, we must acknowledge the kind direction of Providence in these migrations. What wonderful means does Providence use to feed and preserve certain classes of birds! With what tender care does he provide for their subsistence, when it fails them in some countries! Let us learn from this, that all in the great empire of nature is arranged with the utmost wisdom. Is not instinct the same to birds of passage, as reason is to man? And does it not teach them, what reason, if they had it, would dictate, viz. to change their habitations in proper time?

How much ashamed should we be of our unbelief, of our distrust and perplexities, when we reflect on these admirable directions of Providence! These voyages of the birds should instruct us in our duty. How is it that we so often abandon ourselves to discouragement, anxious cares, and fears? Will not that God who so guides the fowls of the air, lead us with equal tenderness, whom he has endued with reason? Can man, the king of animals, be less an object of the tender care of God than they? The whole earth is the Lord's; and should we be found in any country where we cannot fulfil the counsel of God, his beneficent hand can conduct us to such places as shall be more suitable to us. Let us, therefore, follow his merciful directions with confidence and joy.

"I will walk with God my leader, nor will I choose a crooked path; but take that which he marks out for me. He wills my happiness, and I cannot be miserable while led by my kind Father. I will, therefore, follow him step for step with a filial confidence."

OCTOBER XIV.

VARIETY OF TREES.

THE same diversity may be observed among trees, as is seen in other parts of the vegetable kingdom. Some, as the *oak*, are distinguished by their strength and hardness. Others are tall and slender, as the *elm* and *fir*. There are others, as the *thorn* and *box-tree*, which never arrive to a considerable height. Some are knotty, and have rough bark, while others are smooth and beautiful, as the *maple*, the *poplar*, and the *birch*. Some are used in those precious works which adorn the apartments of the rich and great: while others are em-

 Variety of trees.

ployed for the most common and necessary purposes. Some are so slight and weak, that a little wind overthrows them : others are firm, and resist the violence of the *northern blasts*. We see some that grow to an extraordinary height and thickness : and each year for a century past, seems to have added something to their size. Others require but a few years to come to their full growth.

Pliny admired, in his time, trees, out of whose bark boats were constructed capable of holding 30 men ! But what would he have said of those trees of *Congo*, which may be hollowed out into boats capable of holding 200 persons ? Or of those trees which, according to accounts of travellers, are *eleven* feet in diameter ; and on which they can carry a load of *four or five hundred* quintals, or upwards of 50,000lbs. weight ? There is one of this kind in *Malabar*, which we are informed is 50 feet in circumference ! The *cocoa-tree*, which is a species of *palm*, is of this kind ; some of them have leaves broad enough to cover 20 persons. The *tallipot*, a tree which grows in the *island of Ceylon*, and in height resembles the mast of a ship, is also celebrated for its leaves ; they are said to be so large as easily to cover 15 or 20 men from the rain ! They are so pliant when dry that they may be folded up like a fan : in this state they are extremely light, and not thicker than a man's arm. Twenty-three *cedars* still remain on *Mount Lebanon*, which some think have escaped the ravages of the deluge : if this be so, they must be the strongest trees in the world. A learned man who has seen them assures us, that *ten* men cannot fathom one of them. They must, therefore, be 30 or 36 feet in circumference, which seems even too little for trees which are supposed to have lasted nearly six thousand years. The *gum-trees* which are found in the American islands, are ordinarily 26 feet in circumference.

It is not likely that these *cedars of Lebanon* are as old as has been reported : although it is well known that some trees live to a very great age. There are *apple-trees* which are certainly not less than a thousand years old ! And if we compute the quantity of fruit which such a tree bears annually, we must (as has been noticed elsewhere) be astonished at the prodigious fecundity of a single *pippin* ; which would have been sufficient to have furnished all *Europe* with trees and fruits of this sort !

This great variety among trees should remind us of the difference we observe among men, relative to their occupations in life, their modes of thinking, their talents, and the service they perform. As there is not one well grown tree in the forest which may not be of some use to its owner ; so there is no member of society but may be useful in his particular profession. One, like the oak, is remarkable for his firmness and unshaken constancy, which nothing can move. Another has not so much strength as the former, but he has more complaisance and address ; he becomes all things to all men ; is as flexible as an osier, and bends with every breath. If he be an upright man, he will comply only in things innocent and lawful : but if

 Variety of trees.

he be indifferent about God, his duty, and religion, he will always take the strongest side.

However different trees may be from each other, they all belong to the Ruler of the universe ; all are nourished by the same earth ; all are vivified by the same rain, and warmed by the same sun. Would to God ! that all men, whatever diversity there might be among them, would unite to acknowledge that they are all equally the creatures of God ; equally subject to his power ; equally the objects of his tenderest cares ; that they owe their being and support to him ; and have received from his hands the various talents with which they are enriched ! The cedar which rears its majestic head on the top of Lebanon, and the bramble which creeps at its feet, are both nourished by the juices of the earth, and the rains of heaven. Thus the Divine blessing is equally necessary to the rich and the poor. The *most eminent* and *most powerful* among men, should ever remember that they owe their elevation and grandeur to God ; that they are supported by him alone ; and that in a moment he can root them up, overturn, and reduce them to dust.

This consideration will help to repress every motion of pride which may rise in their hearts, and inspire them with that submission and obedience which they owe to the Author of their being.

 OCTOBER XV.

TEMPERATURE OF THE WEATHER IN DIFFERENT REGIONS OF THE EARTH.

IT seems that the state and warmth of countries should be regulated according to their relative position to the sun ; as that planet casts his rays in the same way on all countries which are in the same degree of latitude. But experience teaches us, that heat and cold, and temperature in general, depend on many other circumstances. The seasons may be very different in places under the same parallel : and, on the contrary, are often very much alike in very different climates. As, therefore, accidental causes may make the heat very different in the same latitude ; and since it is very far from being always such as the distance of the sun seems to require ; it is difficult to determine exactly the seasons and temperature of any country.

The vicinity of the sea causes a milder climate. England, and the coasts of Norway, are indubitable proofs of this. The sea may be frozen near the shore, because it is there mixed with a good deal of fresh water ; but this does not take place at any considerable distance from the land ; partly because of the salt which is diffused through the sea ; and partly because of its continual agitation. Thus the cold at sea never comes to the freezing point ; during the winter the adjacent countries benefit by it, the temperature of the weather being much milder. On the contrary, the more a place is elevated

 State of the weather in different regions of the earth.

above the surface of the water, the greater the cold is. The air is not only more thin, and consequently less warm; but the greater part of the heat which is produced by the earth's reflecting the sun's rays, does not take place on high lands, but remains in low places and valleys, where the warmth is always greatest. Besides, if there be, as some think, a subterranean central fire, the higher lands are at the greatest distance from it. *Quito* is almost under the line; but its elevation causes the heat to be more moderate. However, such countries have always a serene and light air, and the temperature is pretty equal. High mountains attract the clouds, hence rains and tempests are more frequent in hilly countries than elsewhere. And we know that it scarcely ever rains in the plains of Arabia. Countries where there are great and extensive forests are very cold: the ice in such places melts more slowly in winter because the ground is covered with the shade of the trees. This ice cools the superior air, and this fresh cold prevents the thaw.

What also moderates the heat in warm climates is, that the days there are not very long: and the sun does not continue long above the horizon. In colder countries the days are very long, and this is the reason why the warmth is greater in these places than might be expected. The serenity of the sky, the clear light of the moon, and the long twilights, render the long nights more supportable. Under the *torrid zone* the seasons are not distinguished so much by winter and summer, as by *dry* and *wet* weather: for when it ought to be summer, or when the sun rises most above the horizon, and the rays fall in the most direct manner possible, then the rains commence, and continue for a longer or shorter time. But in those countries the most pleasant season is when the sun has the least elevation. In the countries beyond the tropics, the weather is more uncertain than within the tropics. In spring and autumn the winds prevail most. In winter the earth freezes to a greater or less depth, but scarcely ever beyond three feet in our climate. In the more northerly countries it freezes much deeper in winter, and thaws but a few feet in summer. The ponds, lakes, and even the rivers are covered with ice: first near the shore, and afterward over the whole surface. The different quality of soils, and the property they have of retaining less or more of that heat they have acquired, contribute something to the difference of climates.

In all these arrangements we may discover such wisdom and goodness as we cannot sufficiently admire. In regulating the temperature and seasons of different countries thus, the Creator has rendered every part of the earth habitable by men and other animals. We often form false ideas concerning the *torrid* and *frigid zones*; and foolishly imagine that the inhabitants of those regions must be the most wretched creatures in the universe. Happily for the world, and for the great satisfaction of all feeling hearts, it is certain that the people of the most distant countries, not excepting even those under the *line*, or near the *north pole*, enjoy a portion of happiness

State of the weather in different regions of the earth.

suited to their nature and destination. Every country has its advantages and disadvantages, which so counterbalance each other, that, laying prejudice aside, it would be difficult to determine which of these countries deserves the preference. There is no corner of the earth in which the goodness of God is not manifested. "From our climates to the most distant zones, all is full of the goodness of the Lord. All the inhabitants of the globe experience his paternal kindness. Not one of his creatures is forgotten. All that breathe derive life, nourishment, happiness, and joy from him."

OCTOBER XVI.

THE ATMOSPHERE OF THE EARTH.

THE air, by which the earth is encompassed, is neither so pure, nor so subtle as the ether; being impregnated with a multitude of particles or exhalations, which are continually detached from the earth, and especially from the waters. This is called the atmosphere. Its lower region, or what is next the earth, is pressed by the superior air, and consequently is more dense. This is sufficiently evident to persons who ascend high mountains; their respiration becomes more difficult in proportion as they ascend. But it is not possible to determine the exact height of the atmosphere; for men cannot ascend very high in it. Neither can we infer, with certainty, from the duration of twilight, how far the mass of our air extends. For granting that the morning twilight begins, and that of the evening ends, when the sun is eighteen degrees below the horizon; and that the latter is produced by the rays which strike the earth, and are reflected by the highest parts of the atmosphere, still there would remain many difficulties to be cleared up. However this may be, the atmosphere is generally divided into *three* regions. The lower region extends from the earth to the place where the air is no longer heated by the rays which the earth reflects. This region is the warmest. The *middle* region begins where the preceding one ends, and goes to the summit of the highest mountains, or even the highest clouds; this is the space where rain, hail, and snow are engendered. This region is much colder than the preceding, as it is not heated by the rays of the sun which pass through it in a perpendicular line. But the *third* region is yet colder: it extends from the *middle* region to the utmost height of the atmosphere; but its limits cannot be exactly ascertained.

The particles which ascend from the earth into the atmosphere, are of different sorts: some aqueous, some metallic, some sulphureous, &c. Now as some of these abound more in one place than in another, hence the great variety in the air, which is very sensible even at a moderate height. A heavy air is more favourable to health than a light one, because it promotes the circulation of the

blood, and insensible perspiration. When the air is heavy, it is generally clear; whereas a light air is generally accompanied with clouds, rain, or snow, which renders it damp. Exhalations increase the weight of the air, and particularly when the heat causes them to ascend to a great height. The air continues light, notwithstanding the aqueous vapours with which it is filled.

Too great a dryness of the air is very injurious to the human body: but this seldom happens for any length of time, except in sandy countries. A damp air is very unwholesome, because it relaxes the fibres, obstructs insensible perspiration, and if heat accompany the dampness, it disposes the humours to putrify. An air too hot dilates all the fluids of the body, and occasions sweatings, which bring on weakness and oppression. On the other hand, when the air is too cold, the solid parts contract excessively, and the fluids are condensed; hence result obstructions, and inflammations. The best air is that which is neither too heavy nor too light, too moist nor too dry, and which is not impregnated with noxious vapours.

It is in the atmosphere that clouds, rain, snow, dew, lightning, and many other ærial phenomena, are engendered. It is to the atmosphere that we owe our morning and evening twilight; as the rays of light are refracted and reflected, and bent in different directions in this mass of air; we see them before the sun rises, and enjoy them some time after he is set. Hence it is that the people under the polar circles enjoy some rays of light, even while the sun is for a long time below their horizon.

The atmosphere is the habitation of the winds, which have such influence on the fertility of the earth, and the health of man. Cities and provinces would be speedily deprived of their inhabitants, and changed into dreary deserts, were the air never to be agitated. The whole world would become one charnel-house, if there were not frequent storms and tempests to purify the air, and disperse those noxious vapours and exhalations, the bane of men and beasts, which are continually floating in the atmosphere.

What reasons have we to bless the Creator for this advantageous arrangement of nature! Were there no atmosphere, or were it different from what it is, our earth would be a chaos, a most wretched abode for its different inhabitants. Let us acknowledge with gratitude the gracious wisdom of our Creator, who has regulated every thing in nature, so as to promote the happiness of all the beings he has formed. We should always remember, that every advantage we derive from the atmosphere comes from that God who is the dispenser of all the blessings of nature. A proper consideration of the benefits which we receive from God, cannot fail to excite every emotion of piety and gratitude. Let us love our Creator with our whole souls, and devote ourselves entirely to him!

OCTOBER XVII.

ANNUAL PROPORTION BETWEEN BIRTHS AND DEATHS.

THAT God has not abandoned the life of man, and the preservation of the human race, to blind chance, but watches over us with paternal care, evidently appears from the exact proportion in which (in every nation of the world, and in all times) men come into life and depart from it. By means of this equilibrium, the earth is neither too thinly peopled, nor overstocked with inhabitants. Yet the number of those who are born is generally greater than those who die : for we find that twelve or thirteen persons are born annually for ten that die. Thus the human race is continually multiplying. Were not this the case, and were the number of deaths greater than the number of births ; in a few ages a whole country would be depopulated ; particularly as various accidents may injure population. The principal hinderances to population are pestilence, war, famine, celibacy, and confinement in cities ; especially those which are very populous, for in such nearly as many die as are born.

Baptismal registers show us, *that more males than females are born.* The proportion is nearly twenty-one to twenty. So that where 1050 males are born, there are only 1000 females. But death, the military life, and divers accidents, restore the balance between the two sexes. In cities there are generally more women than men : in the country the case is reversed.

The number of children, relative to that of families, is also regulated with great wisdom. It is computed, that in *sixty-six* families there are only about *ten* children baptized annually. In a populous country, out of fifty, or *fifty-four* persons, only one marries each year ; and each marriage, one with another, produces *four* children ; but in cities, only *twenty-five* children are reckoned to *ten* marriages. Men capable of bearing arms, make the *fourth* part, ordinarily, of the inhabitants of a country.

By comparing the bills of mortality of different countries, it is found, that in common years, i. e. in such years as there is no epidemic disorder, there dies,

- 1 out of 40 in villages.
- 1 out of 32 in small towns.
- 1 out of 28 in middling towns.
- 1 out of 24 in very populous cities : and
- 1 out of 36 in a whole province.

Out of each *thousand* 28 die annually. Out of 100 children who die each year, there are always three dead born, but there is scarcely *one* out of 200 that dies in the birth. Out of 115 women that die, only *one* dies in childbed : and but *one* out of 400 dies in *labour*. The greatest mortality among children is in the *first* year. Out of 1000 about 293 die before they are one year old. Between the *first* and *second* year, only 80 die out of 1000. But from the 13th to

 Proportion between births and deaths.

the 14th or 15th years, the number is so small that it scarcely ever amounts to above *two* in a *thousand*. This therefore is the time of life in which there is the least danger. Some learned men have observed, that there are more women than men who live from 70 to 90 years ; but that there are more men than women who exceed 90 and live to 100.

Three thousand millions of persons at least may live at one time on the earth ; but there is scarcely one *third* of that number, or at the most 1080 millions, viz. about 650 millions in *Asia*, 150 millions in *Africa*, 150 millions in *America*, and 130 millions in *Europe*.

The most natural inference to be drawn from this is, that God is most tenderly concerned for the life of man, and that it is precious in his sight. Is it possible that such proportion could exist between *births* and *deaths* ; and that this should be so regular and so constant at all times, and in all places, if the wisdom of God had not established, and his providence maintained it ?

 OCTOBER XVIII.

DEVASTATIONS IN THE KINGDOM OF NATURE.

WE now behold beauteous nature, which in spring ravished all our senses, and afforded us such diversified pleasures, subjected to the common law of all created things. Its beauty has disappeared, and every day brings about new revolutions ; and each succeeding one more disastrous than the other. But such is the lot of nature, it contains, in itself, the sources of the most afflicting devastations.

How much mischief is occasioned by the overflowing of seas and rivers, heavy rains, and the melting of snow and ice ! Whole villages drowned, fruit-trees torn up by the roots, crops of corn, &c. laid under water, whole herds carried away, present to our view fearful monuments of the destructive power of the elements.

A shipwreck appears a less fatal disaster ; but a whole commonwealth might have been formed by those men, whom the sea has in this instance swallowed up. Immense sums, which probably whole ages were employed in collecting, lost in a moment ! Whole families are ruined by a shipwreck ; the appearance of the stormy sea, the lamentable cries of the dying, the crash of the vessel which is wrecked—what terror must all these things inspire !

What calamities also proceed from excessive heat, and a long drought ! Grass and plants languish, the ground is dried up, and we are nearly stifled with clouds of burning dust. The waters grow gradually corrupt, and become a deadly drink for the flocks. Heat and putrefaction multiply insects prodigiously : and they lay waste all before them :—they devour the country ; and if they die to-day, they appear again to-morrow in new generations. Famine, the horrible companion of death, comes next : and the pestilence walks by

Devastations of the kingdom of nature.

its side! One bad year, a war, or a contagious disorder, may occasion all these evils.

What confusion and desolation are produced by earthquakes, which become more and more common! Even in the very bowels of the earth, a destroying fire causes pestilential vapours to boil up; which spread death in all directions. Suddenly, and often in the dead of night, the earth bellows and shakes:—whole cities are overturned, and thousands of criminals swallowed up! With what a formidable aspect do volcanoes appear! They are the emblems and forerunners of the devouring flames of the great and last day! Here we behold nature, in other respects so lovely, in a terrible point of view. At this awful spectacle we can scarcely refrain from saying, How imperfect and defective is every thing, except the Creator himself! Many people make *nature* their *god*, and its beauties cause them to forget that Supreme Being, from whom these beauties spring. Let us learn the true state of all earthly things; and acknowledge the advantages which the love of God has beyond every thing to which our hearts can be attached. To feel delight in the contemplation of the august attributes of God, to be made partakers of his grace, to feel that he is our sovereign good, is to triumph over all the desolations of nature. Besides, what can be more proper to increase our love and gratitude to him, than the recollection, that he well knows how to make all these calamities work together for our good?

These apparent disorders in nature, prevent evils incomparably greater, which would not fail to take place, if destructive matter, fire, and subterraneous vapours, continued to be heaped and pent up in the bowels of the earth. Volcanoes and inundations preserve us often from greater calamities. Burning heats serve to dry that ground which in other places had been laid under water. Plague and famine free the world from a multitude of its vicious inhabitants, under which it groans. The extraordinary mortality which sometimes prevails among men, is a very wise mean of maintaining the proper balance in respect to number, and of preventing an excessive population. Nevertheless, we may grant that God would employ fewer scourges on the earth, if his holiness and justice did not oblige him thus to punish, from time to time, the crimes of those who inhabit it.

When we are mere spectators of the devastations which sometimes happen here below, and are not immediately interested in them, it is very right that our gratitude to the Supreme Being, who has preserved us, should be accompanied with sentiments of compassion and charity for our suffering fellow-creatures. Let us never be insensible to the misfortune of others, nor hear, with indifference, the recital of the calamities of people the most remote; as if nothing should affect us but that in which we had a personal concern. In the immense chain of terrestrial events, there is not a single link, however distant, with which we have not some connexion. Were the

 Devastations in the kingdom of nature.

wretched people who have suffered so many distresses greater sinners than *we* are? Why are *they* fallen, while we stand upright? Are the places we inhabit less defiled with iniquity than those where earthquakes and volcanoes have made such ravages? The last catastrophe of nature will be still more terrible to us. The world is not eternal: after having experienced excessive calamities of every kind, its utter destruction shall at last arrive. Nature still flourishes, but she visibly grows old. It is only by the dint of industry and labour that we derive from the earth what it spontaneously presented to our forefathers, and what they collected almost without trouble. Let this earth of our pilgrimage perish, seeing it must perish! Here we have no permanent city: may we know and seek that city which is above, whose founder and builder is the living God!

We should lament over those countries, towns, and villages, which are laid waste: we should be ready to succour them, and divide our bread with the wretched inhabitants. O that they would humble themselves under the mighty hand of God, and patiently suffer the ills which he sends them! Let them recollect that many of their brethren have suffered similar distresses: they were in misery, but their wounds are now healed; their granaries are now better supplied than they ever were, and their burnt houses are changed into palaces. To create and destroy is the work of God, and will continue to be so till the end of time. If he never destroyed, we should never see any new creations; we should have no occasion for acts of resignation and patience; we should not sufficiently know the value of that religion which now confirms and comforts us; and raises us above all afflictions and distresses. Here we have firm footing; and let this be the result of all our reflections: God saw all that he made, and beheld that it was very good. "Yes, Lord, thou art clothed with splendour and majesty: thy judgments are holy and just; all thy works are full of grace and truth. Who would not acknowledge thy power and wisdom, and bless thee with transports of joy, thou Lord of the universe!"

 OCTOBER XIX.

THE CIRCULATION OF THE BLOOD.

THE circulation of the blood is the most mysterious and important of all the motions performed in or by the animal body. In this circulation we observe a certain grandeur which strikes the mind, and makes us feel the limits of the human understanding; and inspires us with a profound veneration for the supreme wisdom of our divine Creator.

The blood circulates continually in our bodies, and this is the principle of its motion. The heart, which is situated within the breast between the two lobes of the lungs, is a fleshy substance, which has

Circulation of the blood.

two cavities, separated from each other by a partition. This machine is in continual motion by alternate contraction and dilatation. The trunk of an artery, which is called the *aorta*, or great artery, proceeds from the left ventricle of the heart. It soon divides itself into many branches, some of which ascend, others descend, by innumerable ramifications, which become smaller and smaller, in proportion to their distance from the heart; distribute themselves on all hands, and penetrate every part of the body. When the right ventricle contracts, it propels the blood into the arteries with so much force, that it goes into the very extremities of their smallest ramifications. This motion is called the *pulse*; it is only the effect of the pulsation of the heart, and is quicker or slower according as the heart contracts with more or less frequency. But what becomes of the blood after it has arrived at the extremities of the arteries, distributed through the body? Nature employs it in the wisest manner. Certain vessels through which the blood circulates, absorb the aqueous particles; others the oily, and others the saline. In other parts of the body, where the arteries are dispersed, the milk or fat are secreted; or other humours which are necessary for certain purposes; or which should be expelled from the body as useless.

That part of the blood which remains after having been thus purified, runs into the extremities of the arteries in such a way, that with the help of a microscope, the little red globules may be seen rolling one after another. But these small channels begin to grow gradually larger, forming vessels which still increase in wideness, and are termed *veins*; by these the blood is carried back into the heart, in the same way that it had been conveyed from it by the arteries.

The veins, therefore, bring back the blood to the heart from all parts of the body, the lower as well as the upper, by a canal which opens in the right ventricle. It does not pass immediately from this into the left ventricle; but the contraction of the heart drives it into the pulmonary artery, which disperses it through the lungs by an infinite number of small branches. Here the blood which has circulated through all the body, and has acquired a certain degree of warmth by its agitation, must, before it recommences its circulation, be cooled by the fresh air, which is brought into the lungs by inspiration. By means of this cooling it condenses again, for during the circulation it was extremely dilated by the heat. It is now received by the pulmonary veins, which conduct it to the left auricle of the heart: this restores it to the left ventricle, which, by its contracting, drives it again into the *aorta*, which distributes it to all parts of the body. Thus the blood circulates, passing from the heart to the extremities of the body, by the *arteries*; and returning from the extremities to the heart by the *veins*.*

* How the blood acquires and preserves its motion; what is the quantity of its circulating power, and what the cause of its colour, are questions not yet satisfactorily answered.—A. C.

Circulation of the blood.

Such is the admirable mechanism of the circulation of the blood in men and animals. But how many obscurities still remain on this subject ! We meet with wonders here which prove to us that the human mind cannot fully comprehend this masterpiece of Divine Wisdom. For instance : is it not astonishing that the motion of the heart should continue without interruption for 70, 80, or 100 years ; and the machine neither wear out, nor fall to pieces ? The blood circulates in the human body 24 times every hour : and consequently goes through the whole body 576 times every 24 hours ; and as at each contraction the heart propels two ounces of blood into the aorta, it is evident that 7200 ounces, that is 600 pounds of blood, pass through the heart in the space of one hour !

May not this alone strike us with astonishment ? But there may be many other wonderful circumstances in this circulation which we know not ; or of which we have very imperfect ideas. In a word, "man, whose government is acknowledged by all things here below, is a composition of wonders. The most admirable mechanism, and the greatest corporeal beauty, are united in him. Each of his members proclaims him Lord of the creation. An innumerable multitude of invisible canals, so formed and measured as infinitely to surpass the wisdom and contrivance of man, conduct and distribute, in every direction, that precious fluid on which our life depends, and cause it to circulate regularly and without interruption. In this universal movement, in this continual flux and reflux, all is regular and well ordered : every thing is in its place, and in the most perfect harmony : nothing is discordant, nothing obstructs, nothing stops, nothing precipitates its course."

This admirable circulation, which takes place in all animals, exists also in every part of nature. The sun revolves round his axis, and the earth, moon, and other planets, perform their appointed revolutions with a regular and determined motion. Not only the air is in a continual motion, (for it incessantly circulates around the earth,) but the water also continues its course without interruption. The rivers fall into the sea, and from the vast surface of the ocean those vapours arise which form the clouds : these are precipitated in showers, which penetrate the mountains and form springs ; which increasing, insensibly form rivers, and these returning to the ocean, restore what had been taken away by evaporation. The earth ever fruitful, produces annual plants and crops ; yet is never exhausted, because the continual circulation of nutritious juices repairs its losses, and restores to it what it had given to us.

All these revolutions of nature lead us to a *First Cause* ; who has so planned the world that all beings are continually in action : they circulate, act, and move in an insensible labyrinth of changes, till they return to their former place, and commence anew the race marked out for them.

OCTOBER XX.

PROPORTIONS OF THE DIFFERENT PARTS OF THE HUMAN BODY.

GOD has formed the human body according to the wisest rules, and established most exact proportions even in the smallest parts. To be convinced of this, we have only to calculate the height and thickness of the body, according to certain specified measures. The height of the body is generally divided into ten equal parts, which, in technical terms, are called *face-lengths*, or *faces*; because a man's *face* was the first model for these admeasurements.

The first *face* takes in the whole of the visage from the root of the hair on the forehead to the tip of the chin. From the beginning of the hair on the forehead to the top of the head, there is one-third of the *face* in height: or what amounts to the same thing, a length equal to that of the *nose*: therefore, from the top of the head to the bottom of the chin, the length is *one face* and a *third*. Between the bottom of the chin and the hollow of the collar-bone, there are two-thirds of a *face*: thus the height from the collar-bone to the top of the head, is twice the length of the face; which is the fifth part of the whole length of the body. From the collar-bone to the bottom of the breast, *one face* is reckoned. Below the breast the *fourth* face-length begins, which ends at the navel. The *fifth* extends to the bottom of the abdomen; which make in the whole the half of the height of the body. The length of the thigh is equal to two faces, and the knee to half the face. The leg, from the bottom of the knee to the *instep*, makes two faces, amounting in the whole to nine faces and a half. From the *instep* to the sole of the foot there is half a face, which completes the ten faces, the measure into which the human body is divided.

This division has been made for men in general: but where persons are very tall, there is found half a face more in that part of the body which extends from the breasts to the bottom of the abdomen. It is the extra length in this place which makes what is called a gentle shape. When the arms are so extended as to form a straight horizontal line; the distance between the tops of the middle fingers of each hand is equal to the height of the whole body. From the hollow of the collar-bone to the joint which unites the shoulder-bone to the arm, there is *one face-length*. When the arm hangs down it is computed at *four face-lengths*: two between the shoulder and the elbow, and two from the elbow to the first joint of the little finger; which makes five faces for each arm, ten faces in the whole, which is a height equal to the length of the whole body. The hand is one face in length: the thumb the third of a face, or the length of the nose, which is also the length of the great toe. The length of the sole of the foot is equal to a sixth part of the height of the whole body. There is a particular measure also for the thickness of the body and limbs. The thickness of a finger is ordinarily the 36th part of the

Proportions of the different parts of the human body.

height : the thickness of the little finger the 48th part. Three times the thickness of the thumb, is equal to the thickness of the hand : six times the thickness of the hand is equal to the whole height of the body.

The height of the human body varies considerably : the finest stature is from five feet four or five, to five feet eight or nine inches. The middle size is from five feet one inch, to five feet four. The least size is below five feet. In general, women are two or three inches shorter than men : their chest projects further, so that generally the capacity of the breast formed by the ribs is deeper and wider in women than in men, in proportion to the rest of the body. The loins of women are wider than those of men, because the bones which form that capacity which is called the *pelvis*, or *bason*, are larger than those of men. Man has more *brain* than any other animal of the same size. He has even more than the horse or the ox. A man who weighs a *hundred pounds* has commonly *four pounds* of *brain*. Infants born at the due time weigh *eight pounds* at most, and *five* at least : their greatest length is *one foot eleven inches*, and their least is *one foot six*.

The human body, whether it be considered in the whole, or in its different parts, is constructed according to the most exact proportions. All is regular, well proportioned, and in the greatest harmony : not only as it respects the size and figure, but the situation also of the different parts. There is not one part which is greater or less than the relation it bears to other members, and the general advantage of the whole machine require. It is impossible to devise a form or situation for any part, which would be more convenient or beneficial to the whole of the members. It is granted, however, that there may be varieties and irregularities among them, which do not destroy the principal design of the body. Ill-shaped persons and monsters are proofs of these irregularities. But if certain disproportions in the size, form, and position of the parts, may be compatible with the principal design, they still hurt the grace and beauty of the outward appearance. How great should the gratitude be of those persons who are well-shaped, and whose members are all in just and agreeable proportion. O that our souls were as pleasing in the sight of the Lord as our bodies are in the eyes of men ! When shall our souls and bodies be in the same harmony which prevails among the members of a well-formed body ? When this takes place we shall be pleasing in the sight of our God : and glorify our Father and Redeemer with our bodies and spirits which are his.

OCTOBER XXI.

OF NAVIGATION.

TO a reflecting mind, navigation is a subject which may give rise to the most important reflections. Here our curiosity is excited, and at the same time satisfied in different ways, so as to become a new source of pleasure. In general we consider navigation only in reference to the advantages it affords us; but we should also consider the construction and motion of ships, without which, navigation could not exist.

First, is it not very astonishing that such an enormous and heavy mass as a ship can float on the water? The weight of a ship is greater than we imagine; and it requires but little attention to be convinced that the pressure on the water must be prodigious. A *man of war*, which carries 800 men, has commonly provisions laid in to support that number for three months, and carries besides from 70 to 100 guns. Now supposing each man to weigh only 100 pounds, and each cannon 900, (although there are cannons that weigh more than 40 hundred;) and supposing that each man eats but *three* pounds weight of food in the day, this moderate calculation will make the burden to amount to more than 386,000 pounds. But the weight of the vessel itself is not taken into this calculation; the rigging, and a multitude of materials necessary to keep the vessel in repair, load the cannon, &c. are articles which at least equal, if not surpass the preceding sum.

However, this enormous mass of at least 772,000 pounds may be moved with a very gentle wind! Is not this inconceivable? Does it not appear contrary to the laws of nature? No: it is quite natural, and should the contrary happen, it would be miraculous. It is not the wind that drives this mass; the ship with its whole burden *swims* on the water. But how can so heavy a body float? How can the water, whose particles are not strongly connected, have strength and consistency enough to support this enormous mass? It is the effect of an equipoise; the ship sinks till the volume of water which it displaces be equal to it in bulk. Suppose a vessel to be 120 feet long, and 15 broad, and that it sinks two feet in the water, i. e. 3600 feet of water, or so much cargo, because the one takes place of the other. Thus the river is not more loaded with the ship and her cargo, than it was with the water which the ship removes from the places which she occupies.

Formerly navigation was very dangerous, and more laborious than it is at present. People did not dare to venture themselves far out in the open sea, but coasted along without losing sight of the shore. But since the invention of the *compass* they cross the seas with more confidence and safety. Before this valuable discovery, it was a sort of wonder to make even short sea voyages. In *Homer's* time, it required great preparations and long deliberation before his heroes

could determine to cross the Egean sea. The expedition of *Jason* and his argonauts to the *island of Colchis*, was considered as the wonder of the world. But what are these in comparison of *our* sea voyages? By the discovery of the compass we are enabled to make such long voyages; the magnetic needle turning always to the north, to inform the navigator in what region he is, and the countries to which he directs his course. In the darkest night, in the most cloudy days, in the very midst of the ocean, this instrument serves him as a guide, and leads him from one end of the earth to the other.

Have we ever reflected on the advantages of navigation? Have we ever been sufficiently grateful to our Creator for these advantages? Whoever we may be, it is to navigation we owe, either directly, or indirectly, a great part of the things necessary for our subsistence. We could not have those spices and medicines which come to us from different countries; or at least could not procure them but at great trouble and expense, did not vessels bring them into our ports. We should be much distressed indeed, were we obliged to bring all our necessities by land. The following calculation will prove this. The freight of a ship is reckoned by *tons*: and a *ton* weighs 2000 pounds; therefore a vessel whose burden is 600 tons, carries 1,200,000 pounds weight! Now allowing 1000 pounds weight to a horse, it would require 312 four-horse wagons, i. e. 1248 horses, with a man at least to each wagon, to transport this cargo. But how could we procure treasures from other parts of the world? and how expensive would it be to acquire even the bare necessities of life? Besides, should not navigation be considered as one of the greatest blessings of our Creator, when we reflect that it has been the means of carrying the knowledge of the Gospel of Christ to the remotest nations of the world? Can this consideration fail to inspire us with the most lively emotions of gratitude to God? On the other hand, should we not thank him that *our* calling does not oblige us to brave the dangers of the seas, and expose our lives continually in order to enrich ourselves, or to procure even the means of a bare subsistence? Whilst then, at a distance from all these perils, we live peaceably among our families, should we not recommend those of our brethren to the protection of God, who are obliged to brave the seas, and undertake long and dangerous voyages for the benefit of society, and consequently for our particular profit?

OCTOBER XXII.

BEASTS OF DRAUGHT AND BURDEN.

ANIMALS of this kind render us so many services, and are so very useful, that it would be a sort of ingratitude not to examine them with particular attention.—We generally content ourselves with subduing them for our food, or training them to assist our weakness by

Beasts of draught and burden.

their strength; but through ignorance or indolence we neglect to consider them in their relation to the rest of the creation, and to reflect on the wisdom and goodness of God, which are so visibly manifested in the production of these useful animals. Possibly the following meditation may make us more attentive to this subject, and serve to excite our gratitude to the Creator.

Of all domestic animals, the *horse* renders us most service, and does it the most willingly. He suffers himself to be employed in the cultivation of our grounds. He tamely submits to all kinds of labour for a moderate and frugal subsistence. He shares with men the pleasures of the chase and the dangers of war. He is a creature who gives up his own being to exist only by the will of another; he even anticipates this will, and by the promptitude and precision of his motions expresses and executes it. He abandons himself unreservedly to his master; refuses no labour; exerts all his strength; goes beyond it, and sometimes even expires in his efforts to obey. Nature has given him a propensity both to love and fear man, and has rendered him very sensible of those caresses by which his servitude is rendered pleasing. The horse, of all animals of his size, is the best proportioned in every part of his body. Every thing in him is regular and elegant. The exact proportion of every part of his head gives him a light and lively look, which is considerably heightened by the beauty of his chest. His carriage is noble, his step majestic, and all the members of his body seem to announce energy, strength, courage, and stateliness.

The *ox* has not the gracefulness and elegance of the horse; his monstrous head, his limbs too small and too short for the size of his body; the smallness of his ears, his stupid look and heavy pace, may be considered as imperfections: but all these irregularities are compensated by the important services which he renders to man. He is strong enough to carry heavy burdens; and is contented with scanty fare. Every thing in this animal is of use; his blood, his hide, his hoofs, his flesh, his fat, and his horns, may all be applied to a variety of purposes: his very dung is the best sort of manure for enriching the land, that it may be capable of producing new aliments. The structure of the organs of digestion in this animal is very remarkable. He has *four* stomachs: the first of which can contain forty or fifty pounds weight of food: the *third* stomach God has so constructed that it has eighty-eight folds, in order to assist digestion; whereas the stomachs of sheep and goats have but *thirty-six*.

The *ass*, however unpromising his outward appearance may be, and however despised, has, nevertheless, very excellent qualities, and is very useful to man. He is not fiery and impetuous, like the horse, but peaceable, simple, and always well tempered. He has no stateliness, goes smoothly on his way, and carries his load without noise or grumbling. He is temperate both as to the quality and quantity of his food. He is contented with thistles, and the hardest and worst

 Beasts of draught and burden.

herbs. He is patient, vigorous, and indefatigable ; and renders his master constant and important services.

How is it that we can have these animals daily in our employ, and not think, at the same time, of the Creator who has formed them, and given them those properties which are so useful to us.—It is a circumstance well worth the attention of a reflecting mind, that the number of *beasts of burden*, and *draught cattle*, is beyond all comparison greater than that of *wild beasts*. If the multiplication of the latter were equal to that of the former, the earth would soon be laid waste. Can we reflect, without gratitude, on the goodness of God, who has given us the dominion over these creatures ; the strength or skill to subjugate them ; the right to apply them to our use ; to change their natural state at pleasure : to oblige them to obey, and employ them as we think good ? This dominion over the creatures is the gift of God, by which man may every moment perceive the excellence of his being. If God had not impressed animals with a natural fear of man, it would have been impossible for him to subjugate them by force. Seeing then that it is to God we owe the empire which we have over them, it is highly unjust to abuse these creatures, either by excessive labour, or by any other mode of ill-treatment.

 OCTOBER XXIII.

WINTER SEED-TIME.

A GREAT part of the food designed for man and other animals, is at this time confined to the earth. When the husbandman has sown his winter's corn he begins to enjoy a little rest. He will soon have the satisfaction of seeing his fields clothed gradually with a beautiful verdure, giving the promise of a plentiful harvest. Nature indeed works in secret while the germ is unfolding itself ; but its operations may be discovered by taking some of the seeds out of the ground which begin to sprout. Two days after the seed has been sown, the juices with which it is swollen penetrate the germ and cause it to shoot. The germ is always situated at one extremity of the seed ; and that part which is next the outside is the little root of the future plant. Twenty-four hours after the corn has been sown, the germ commonly begins to pierce the coat of the grain, and to disengage itself. It puts out its root and stalk ; the root is at first wrapped up in a sheath which it bursts. Some days after, other roots shoot out at the sides, each disengaging itself from its sheath. On the fifth or sixth day a small green point begins to appear above the ground. It continues a considerable time in this state, till in fine weather the ear bursts forth from its coat, by which it had been protected from cold and uncertain weather.

 Winter seed-time.

All this necessarily leads us to reflect on the nature of human life. Our present existence is the germ of an eternal life. We are here below in our seed-time, and can discover but very little growth. The full ear, the ripe fruit, and the sheaves in perfection we cannot see here below ; the ingathering is not made on earth.—We live in hope. The husbandman, after having sown his field, abandons his seed to corruption, to rain and storms, and to the heat of the sun ; but he does not yet see what the result will be. This is precisely what happens in regard to the spiritual seed. Let us not be proud because the seed is sown ; nor be discouraged because we do not immediately see the fruits. Let us continue to *sow unto the Spirit* ; and possibly our good works wrought thus in God, however trifling in themselves, will have blessed consequences hereafter.

Now that our seed is committed to the ground, let us wait without care and anxiety, till at the end of nine months we reap the fruit of our sowing ; and in the mean time, like the pious husbandman, let us beseech God to crown our fields with his blessing.

 OCTOBER XXIV.

GOD'S PARTICULAR PROVIDENCE.

IT would be a great misfortune for me and for the world, were there any foundation for that principle of unbelievers, that God concerns himself only with the *totality* of beings ; and takes care of whole societies, of all genera and species ; but not of individuals. What a ridiculous god is that of the *Freethinkers* ! Or rather, does he deserve the name of a god, who either cannot, or will not concern himself with the *parts* of which the *whole* is composed. For our comfort we are taught, both by reason and revelation, to believe in a God whose providence is extended to every creature in particular, and to every part of which each creature is composed.

Let none imagine that it is beneath God to attend to individuals. The whole universe, as well as the meanest particle of dust, is nothing in comparison of the Infinite Being. This being the case, what is it that we can call little or contemptible ? Is there not a greater difference between an individual and whole nations, than there is between those immense globes which appear so little to the eyes of the common people ? The least consideration will be sufficient to convince us, that in the sight of God, to whom a thousand years is but as one day, and the whole universe as a drop in comparison of the ocean ; there is nothing which is either great or little in itself ; nor any event, however inconsiderable it may appear, that is unworthy his attention. Let us take the meanest plant, or the smallest insect that we can possibly dissect, and we shall discover, even in its *smallest parts*, the same wisdom which shines in the structure of the *whole*. The least *fibre* contributes as much to the perfection of the whole

God's particular providence.

plant or animal, as *they* do to the perfection of the entire *species*; and as the *species* does to the perfection of the *universe*. If, therefore, God has not thought it beneath him to *form* creatures which appear so despicable, why should it be thought beneath him to *preserve* them? Besides, how could the whole be perfect if the parts were not so? Or how could the whole species be preserved without the preservation of the individuals?

Plain reason proclaims this to us, and revelation completes our conviction. It teaches us that the very hairs of our head are numbered. A hair, the meanest appendage of our bodies, thousands of which we lose in the course of our lives without perceiving it, or suffering any sensible loss through it: even all these are numbered! And from this our blessed Saviour draws this conclusion, that with much greater reason God interests himself in our behalf, and condescends to honour us with his attention; and this he does more particularly because all men have been redeemed by the blood of his well-beloved Son; and have acquired new value in his eyes in consequence of becoming the brethren of the Lord Jesus.

O Eternal Providence! I adore thee in Christ Jesus; I adore and bless thee, O God, with the liveliest emotions of gratitude! Even before the foundation of the world thou didst lay the plan of my happiness: before I could supplicate, and before I could return thanks! Can it then be possible that thou shouldest now forget me? My Redeemer has undertaken for me; he has even suffered the most cruel torments in my behalf; can it cost him too much to watch over me? No. He will preserve what he has so dearly purchased. Shall we then permit ourselves to be stumbled by the railleries of vain and wicked men? No. Let us confide in that Providence which the infidel would wish to persuade us takes no care of its creatures. Let us consider that we were not formed for this world, and that it is only in the world to come that the wonders of God's grace shall be manifested to us in all their splendour. But what are we, O God, that thou shouldest think of us, creatures so base, corrupted, and sinful? Who are we, that the Holy of holies, the Being of beings, the Almighty, Infinite, and Eternal God, should pay any attention to us! What is man that thou art mindful of him, and the son of man that thou visitest him? What motives should this afford us to walk before thy face in uprightness, abstaining from every appearance of evil! Thy eye is ever open upon us, and thou art pleased that we confide in thy providence. Lord, strengthen our faith, that we may not be stumbled by the depth and obscurity of thy ways; and grant that all the dispensations of thy providence may terminate in our endless salvation. Amen.

OCTOBER XXV.

THE MEASURE AND DIVISION OF TIME.

TIME is measured and divided according to the revolutions of the heavenly bodies, and especially by those of the sun and the moon. These two globes have most influence on the state of mankind. The revolution of the moon serves only to divide the time on our globe : but the sun undoubtedly serves to regulate that division in all the planets which turn round him.

Day is that portion of time which the sun takes up in making an apparent revolution round the earth ; or, to speak more correctly, the time which the earth takes up in revolving round its own axis. That space of time during which the sun is above the horizon, is called an *artificial day* : this is the time of *light* which is determined by the rising and setting of the sun. The time of *obscurity*, that is, the time during which the sun is below the horizon, we call *night*. The day and night taken together make the *natural*, or *solar day*. This day is divided into twenty-four parts, which are called *hours*. Each hour is subdivided into sixty equal parts, which are termed *minutes* ; each minute into sixty *seconds*, and each second into sixty *thirds*. The division is capable of being extended still further, but it is seldom found necessary.

This division of the day into hours, minutes, &c. is pointed out by the shadow of the gnomon of a sun-dial, and by the hands of a clock, or watch. Well constructed sun-dials always show the true time of the sun ; but clocks and watches, which are always regulated by the *mean* time of the sun, require frequent alterations. In common life the greater part of *Europeans* begin their day and their hours at *mid-night* : from which to mid-day they reckon twelve hours, and twelve hours from that to the ensuing midnight. The *Italians* begin their day at *sunset* : and from that to the succeeding evening they reckon twenty-four hours. The *Turks* begin their day a *quarter of an hour after sunset* : from which they reckon twelve equal hours ; and when these are run out, they reckon twelve more to the following evening. The *Jews* begin their day at *sunset* : from which they reckon twelve equal hours to *sunrise*, and as many more from his rising to his *setting* : consequently the hours of their day are longer or shorter than those of the night, in proportion as the day is longer or shorter than the night.

A *week* is the space of *seven days*. A *solar month* is the time which the sun takes in passing through one sign of the zodiac : but these months do not begin and end exactly at the entering of the sun into a new sign. A *lunar month* is the time which elapses from one new moon to another : that is to say, twenty-nine days, twelve hours, and forty-four minutes.

The *solar year* comprises twelve *solar months* ; that is to say, the time which the sun takes up in going through the twelve signs of the

Measure and division of time.

zodiac ; and this time is generally computed to be three hundred and sixty-five days, five hours, and forty-nine minutes. These years are at present in use among all the people of Europe. The *lunar year* is that space of time which comprehends twelve *lunar months*, or twelve revolutions of the moon round our earth. It is composed of three hundred and fifty-four days, eight hours, and forty-eight minutes. The *Jews* and *Turks* still reckon by this year, but to make it correspond to the solar year, they often intercalate a whole month. Our common year begins ten or eleven days after the sun has entered Capricorn.

These measures and divisions of time, how unimportant soever they may appear in themselves, are nevertheless of great consequence in their application to civil life. The hours, days, weeks, months, and years, which constitute our earthly life, are granted unto us that we may use them so as to fulfil the great design of our existence. But how do we employ these precious moments ? *Minutes* and *seconds* are in our eyes but trifles, which do not deserve our attention. Nevertheless it is certain, that he who takes no account of minutes will throw away hours. But are we more economic in larger periods ? Alas ! if from all the days which have been allotted us, we subtract those which have been entirely lost in respect to our immortal souls, how much of real and effective life will remain ? Will it not appear, as the result of this calculation, that man at the age of *seventy* years, has lost *fifty* ? And that he who has arrived to fifty years, has scarcely spent seven of them in securing his eternal interests ? O God of mercy, how distressing and humiliating is this consideration ! What hundreds, what thousands of days and hours which have been entrusted to us by thy fatherly goodness, that we might employ them in promoting the eternal welfare of our souls, have been shamefully consumed in departing from thee, thou best and most tender of parents ! How many years spent in idleness and vice, in gratifying criminal passions, and in injuring our brethren ! And with what inconceivable rapidity does the few moments that remain fly away ! Without scarcely perceiving it, an hour is already lost, irrecoverably lost ! And an hour is a great deal to a man who may easily reckon his real and effective life by *hours*. Lord, enter not into judgment with us for the days which we have so miserably mispent ! *And so teach us to number our days, that we may apply our hearts unto wisdom !* May we henceforth make a proper use of the time which thou mayest still condescend to grant us, by getting an interest in the grace of our Lord Jesus Christ, and an assurance of our eternal felicity ! It is only by thus fulfilling thy merciful designs that we can be said either to have lived long, or lived happily.

The end of summer.

OCTOBER XXVI.

THE END OF SUMMER.

THE sun is casting the last of his summer rays upon the earth : every thing with us is changed. The earth, which a short time ago was so beautiful and fertile, is growing, by degrees, dismal, poor, and barren. We no longer see that fine enamel of trees in blossom, the charms of spring, the magnificence of summer, those hues and different shades of verdure in the woods and meadows, the purple colour of the grapes, nor the golden crops which clothed our fields. The trees have lost their late clothing ; the pines, the elms, and the oak, bend under the fierce blast of the north wind. The rays of the sun are too feeble to warm the atmosphere, or penetrate the earth. The fields, which were so liberal in gifts, are now exhausted, and promise no more for this year. These melancholy changes must naturally diminish our pleasures. When the earth has lost its beautiful verdure, its vivid colours, its splendour ; in a word, its glory : when the fields present nothing but a boggy soil and dull colouring, we lose that pleasure which we before received through the medium of sight.

When the earth is stripped of its crops, its grass, and its leaves, nothing is to be seen but a rugged and uneven surface : it has no longer that striking appearance which the corn, herbage, and various kinds of pulse, collectively produced.—The birds cease from their songs, and nothing recalls to the mind of man that joy, that universal gladness, which he before shared with all animated beings. Deprived of the pleasure which the melodious concerts of birds afforded him, he hears nothing but the murmuring of waters, and whistling of the winds ; a continual monotony which can excite nothing but disagreeable sensations. The fields have lost their perfumes, and we respire only a sort of damp odour, which, as it is not followed by the sensations of heat, has nothing agreeable in it. The sense of feeling is injured by the impression of cold and humid air. Thus the country presents nothing that can flatter our senses : the delicate nerves, which are their instruments, extend too much on receiving disagreeable impressions, and afterward get into an extreme state of contraction. It is the same with all the muscles, to which the feeble rays of the sun can now communicate no energy.

But in the midst of these gloomy prospects we have still cause enough to acknowledge how faithful nature is to fulfil the eternal law prescribed to her, of being useful at all times, and in every season of the year. The winter approaches, the flowers disappear ; and though the sun sometimes shines out, the earth no longer possesses her wonted beauty. Nevertheless, stripped and desert as the country is, it still presents to a feeling mind, the *image*, at least, of happiness. With gratitude to Heaven we may say, Here we have seen the corn grow : lately these barren fields were clothed with abundant

crops : it is true, that the orchards and gardens are stripped bare ; but the remembrance of the presents which they have made us cannot fail to mingle a sentiment of joy with the shiverings which we feel through the influence of the bleak north wind.

The leaves of the fruit-trees are fallen ; the grass of the meadows is withered ; gloomy clouds cover the face of the sky ; the rains fall in abundance ; the roads are cut up ; and pleasant walking is no longer practicable. The man who does not reflect, murmurs at this, but he who is wise, beholds, with emotions of joy, the earth deeply drenched with rain. The withered leaves, and the yellow grass, are prepared by the autumnal rains to form a rich manure to fertilize the land. This reflection, and the pleasing expectation of spring, should naturally excite our gratitude to the Creator for his tender care of us, and should induce us to repose our whole confidence in him. Though the earth has lost its beauty, and all its external charms, and though it be even exposed to the murmurs of the children it has nourished and delighted, it has, nevertheless, commenced its labour anew, and is working secretly for their future welfare.

But why is not the moral world as faithful to accomplish its destination as the natural world is ? The acorn will always produce an oak, and the vine grapes ; why then has not the great man children which always resemble him ? Why have men of learning, and eminent artists, ignorant and stupid descendants ? Why do holy parents bring into the world vicious and wicked children ? When we reflect on this difference, we may find several natural causes for it : and we see that what often happens in the natural, may also happen in the moral world, viz. that the best vine, for lack of a good soil and temperature, will produce bad and sour grapes ; and virtuous parents may have degenerate children. In carrying these reflections further, may we not look back on ourselves and say, Are not our brightest days often obscured ; and has not the glory that surrounded us often disappeared like the leaves of the trees ?

Possibly our lot here below may have a vicissitude of seasons. In such a case we should have recourse, in the winter of our life, to the fruits collected in the days of our prosperity, and endeavour to make a good use of the fruits of our education and experience. If our harvest has been very productive, let us divide with the poor, whose rugged, or ill-cultivated soil, could yield but a small portion of fruit. Let us studiously endeavour, during the summer of our life, to have an autumn abundant in good fruits ; honourable to ourselves, and useful to mankind. Happy if, at the end of our *autumn*, we may carry down with us into the grave the glory of having borne some fruit to the honour of God, and the good of society.

OCTOBER XXVII.

THE MAGNIFICENCE OF GOD IN THE WORKS OF CREATION.

GOD *has manifested himself in the creation, as a being infinitely wise.*

There is no creature, however useless it may appear to us, but what has its particular destination : and all are so formed, as to answer, in the most proper manner, the end of their existence. This we know certainly to be the case in those we are acquainted with, and we conclude the same of the others by analogy. If we begin with the *sun*, and descend to the smallest *worm*, or *plant*, we shall be obliged to acknowledge, that in order to be perfectly adapted to the ends for which they were created, they could not have been formed in any other way : and that, relatively to those ends, there is no defect in them. The very smallest parts of each creature are evidently well adapted to their particular uses ; they accomplish the functions which God has prescribed ; and the whole creature would be defective, and could not answer, but imperfectly, the end of its existence, were any of its parts to be cut away, or injured. And how wonderful is that *whole*, which results from the relations and connexions which the creatures have among themselves. Each is in its place ; each has its proper functions ; and these functions are necessary to the perfection of the whole ; and none of these can fail without producing more or less disorder in the *whole*. When we represent to ourselves the Being who has formed this innumerable multitude of creatures, animate and inanimate ; who has not only designed each for a particular end, but has also disposed and arranged all its parts, so as to be most suitable to that end, without either superfluity or defect ; who, by the union of all the individuals, has formed an admirable whole, where the most perfect harmony prevails ; must we not be struck with astonishment, and cry out, O ! the depth of the wisdom and knowledge of God !

God has manifested himself in the creation, as a being infinitely good.

Every where he has dispensed being, motion, and life. What multitudes of animated beings has his beneficent hand produced ! Ever since the foundation of the world, man has endeavoured to find out all the living creatures which inhabit the earth, and yet new species are daily discovered, which were hitherto unknown. Is not life an inestimable blessing to all that breathe ? Is it not a benefit even to the vilest worm ? What pleasure must God have in doing good, seeing he communicated the blessing of conscious existence to so many beings ! But of what use would their existence be, were they to be immediately deprived of it ? The Creator has taken care that every living creature shall exist as long as is necessary to answer his purpose in its creation. He has marked out to each creature the place of its habitation : and each finds, at its entrance into the world, whatever is necessary for the preservation of its being. Many animals bring into the world with them that instinct and industry which

Magnificence of God in the works of creation.

they stand in need of to find their food. Others, as *man*, are supported and instructed by their parents. And with what an inexhaustible fertility has God endowed the earth for the benefit of mankind! For nearly six thousand years he has nourished so many millions of men, and other animals; and were the world to subsist as long again, we need not doubt but he would continue to provide a sufficiency of nourishment for all succeeding generations. With life, how many pleasures and pleasing sensations does the Creator grant to animated beings, and especially to man! With what magnificence has he adorned and embellished the world, the place of his habitation! What comforts does he make him partaker of in social life! With what tender relations, warm affections, and delightful sentiments, does he cheer his heart! Let us never be ungrateful to such an indulgent Creator! Seeing we are endued with reason; seeing we are capable of knowing and loving our God; let us acknowledge, with transports of joy, that the earth is full of the loving-kindness of the Lord.

God has manifested himself in the creation, as a being infinitely powerful.

This unlimited power, which is seen at first view in all the creatures, may be still more particularly perceived in the two extremes; that which is *greatest*, and that which is *least*, in the universe. Who but a being infinitely powerful, could have constructed the immensely extended firmament, that prodigious space in which such a vast number of huge worlds are contained! Who but himself could have hitherto preserved this vast edifice; established it so that it cannot be shaken; and yet support it in all its various and regular motions! Who else could raise the sun to such a height, appoint him his place, prevent his departing from it, and support him without a prop in this immense space! Could any thing less than infinite power give motion to the earth, the moon, and the other planets, so that they should revolve invariably in their appointed orbits, finish and begin afresh their revolutions at certain fixed periods?

If we consider the omnipotence of God in the *smallest* objects: here also we shall find it as incomprehensible as in the *greatest*. Let us only cast our eyes on the dust on which we tread. This dust is inhabited by an innumerable multitude of creatures; many thousands of which united, would not amount to the size of a grain of sand! Nevertheless, each of these has all its external members and internal organs: each has its various sensations, each its peculiar instincts, is endued with the love of life, and seeks to preserve it. Behold the grass of the field, the hair of your head, and the blossoms of the trees; study their structure, their origin, and their use: and in all these you shall clearly discover the infinite power of Him who forms the celestial bodies with the same ease that he creates a worm, or causes a blossom to spring forth.

Lord, how great and numerous are thy works! In wisdom thou hast made them all, and the earth is full of thy goodness. Teach us

to be as attentive to these things as we ought to be, that we may know thou art the Lord who madest the heavens and the earth. Let these considerations be the means of filling us with love to, reverence for, and confidence in, this most amiable, most magnificent, and most powerful of all beings !

OCTOBER XXVIII.

THE LAW OF INERTIA.

INERTIA is nothing more than the power of resistance, through which all bodies are disposed to remain in that state in which they are. When a body is at rest, it resists the motion which we desire to give it ; but when it is once put in motion, it persists in it from the same cause of inertia, and resists as forcibly those bodies which would stop its progress, as it did those which first put it in motion. Nothing can be wiser than this law, which the Creator has established. Through this, bodies move with perfect regularity ; and by it we can exactly determine the laws of motion and percussion.

If the celestial bodies had not this power of resistance, they could not move with so much order and regularity ; and they must continually have a new moving cause to preserve them in motion. From this it appears, that an infinite wisdom formed and arranged the universe. The suppression of any one part of the immense edifice would bring the rest into disorder. Of what use would the regular structure of plants and animals, and the admirable arrangement of the celestial bodies be, if these different bodies were not susceptible of motion ? But how simple is this law, and how wonderful are its effects ! Such are all the works of the Creator : the principles are extremely simple, but the whole edifice is so much the more admirable. The universe resembles a magnificent palace : the strong and rugged walls on which the building rests, appear to have neither elegance nor beauty. Nevertheless, they are so indispensable, that without them the least motion of the air would overturn the edifice.

However, even these apparently rough foundations have their beauty, though every person is not capable of discerning it. One must be an architect himself, or at least, be well acquainted with the rules of this art, in order to be able to enjoy the pleasure which the construction and symmetry of the foundations afford. None but an artist can perceive why the foundation has that depth, breadth, and length, which the architect has given it : he sees that it must be such as it is, that it may be what it ought to be : he has the satisfaction to be capable of forming a right judgment of the work ; and he knows that the work is perfect. This is exactly the case in contemplating the works of God. Every spectator is not able to discover the fundamental laws on which the greater part of the phenomena depend, nor to find out the wisdom of the plan. This knowledge is reserved

for the true philosopher, and is to him a source of inexpressible pleasure.

It seems as if there was also a certain *inertia* in *mind*, as well as in *matter*. Bodies which constantly move in the same way, and to the same point, have a certain tendency to it. The human spirit has a certain propensity to those actions which we have often in the same way repeated. Hence it is, that we find such difficulty to conquer certain *habits*. Now we might make an excellent use of this natural *inertness* of our minds, in using it to strengthen us in virtue. In order to this we should often repeat the same acts, till we feel ourselves as much accustomed to good and virtuous actions, as we are at present to those that are vicious. This is so much the more important, as, without virtue, we can never arrive at true and solid peace. But whence come the mistakes into which we so frequently fall, in this respect? Why do we continually pursue imaginary good, which, in the end, leads us to destruction? Our hearts, seduced by that pride which is natural to them, and dazzled with the false splendour of sensible things, cause us reluctantly to approach the paths of uprightness. But let us not be discouraged with being obliged to do violence to our evil passions and propensities. The vicious themselves are often obliged to restrain and resist their passions in order to procure some temporal advantage, or to escape some particular danger. And the efforts which they are obliged to make, in order to resist their sensual appetites and desires, must be very bitter and grievous to men of corrupt minds. On the contrary, what pleasing satisfaction must they feel, whose souls have resumed the authority which they should ever maintain over their senses! A frequent exercise of this authority may be a mean of conducting us to that happy state, where the soul, elevated (so to speak) above the tumultuous region of passions, sees, with pity, the mean and despicable swarm of the slaves of vice.

There is a good deal of strength in the above reasoning; but I am firmly persuaded, that a habit of righteousness never was, and never can be acquired merely by a repetition of acts. The power of God alone can dispose the soul to do good; and it ever was, and ever will be, the prerogative of the grace of Christ to change the human heart. Yet he who acts in the above way, *under the Divine influence*, will certainly come good speed.

A. C.

OCTOBER XXIX.

THE WANTS OF MEN.

THERE is no creature on the earth which has so many wants as man. We came into the world naked, destitute, and ignorant. Nature has not endued us with that industry, and those instincts, which beasts have at their birth: reason only has been bestowed on us, that we might acquire, through it, requisite talents and knowledge. In this respect, the state of the brute creation may appear enviable. Is

Wants of men.

it not happy for them that they have no need of the clothing, instruments, and conveniencies which are so requisite for us ; and that they are not obliged to invent and exercise that multitude of arts and sciences, without which we could not procure ourselves the necessaries of life ? They bring with them, at their birth, clothing, arms, and every thing they need ; and if they want any thing, they can easily procure it by means of those natural instincts which they blindly follow. If they want dwelling places, they either know how to dig or build them. Have they need of beds, coverings, changes of raiment ? they know how to spin or weave them ; to cast off their old garments, and get new. If they have enemies, they are provided with arms for their defence : if they be sick or wounded, they know where to find proper remedies. Now we, who are so superior to all other animals, have more wants, and fewer means of supplying them.

It may be asked, why the Creator has, in all these respects, privileged man less than the beasts ? This curiosity is doubtless excusable, provided it be unaccompanied with complaining. The wisdom of the Deity is manifested in this, as well as in every other thing. In subjecting men to so many wants, God designed that they should be continually obliged to exercise that reason which he has given, to their happiness : and which to us supplies the place of all the resources of other animals. And because we are destitute of those instincts with which they are endowed, we are obliged to use our reason in order to gain a knowledge of the world and of ourselves ; to be active, diligent, and laborious, that we may guard against want, pain, and disappointment ; and so lead a quiet and pleasant life. By using our reason, we see the necessity of bridling our strong passions, and avoiding those excesses which might prove fatal to us. A few examples may convince us of this. If we could procure fruits, and all other necessary aliments, without labour, we should infallibly become indolent and idle, and would spend our lives in the most degrading sloth.

The noblest faculties of man would be enfeebled, and become stupid. The bonds of society would be broken : for men would no longer live in a state of mutual dependance. Even children could then do without the assistance of their parents, and would need no help from others. The whole human race would fall in a state of barbarism and savage stupidity ; each, like the brutes, would live for himself, and there would be neither subordination, nor mutual obligations, nor good offices. It is to our wants that we owe the development of our faculties, and the prerogatives of humanity. They awaken the mind, dispose us to activity and industry, by which our lives are made more easy and pleasant than those of other animals. Our wants have made us sociable, rational, and regular in our manners : and have led us to invent a multitude of useful arts and sciences. In general, an active and industrious life is both useful and necessary to man. Were not his strength and faculties brought into action, they would become a burden to himself : he would gradually fall into stupid

ignorance, into low, brutal indulgences, and into all the vices necessarily resulting from them.

Labour, on the contrary, puts the whole machine into a pleasing state of action, and procures us satisfaction and pleasure, in proportion as it requires invention, reflection, and knowledge. Natural wants were to us indispensably necessary, that we might be rational, wise, social, virtuous, and happy. If, after having been fed with our mother's milk, we had no need of succour or instruction, we should live for ourselves alone, refer every thing to ourselves, learn no language, and make no use of our reason : stupid, and profoundly ignorant of ourselves and other beings, we should understand neither arts nor sciences, and be strangers to the noblest pleasures of the mind. But now the wants of children, and the helpless state in which they come into the world, oblige the parents, through pity and tenderness, to take care of them ; while the children, on their part, are attached to their parents through a sense of their wants, and a fear of danger, they submit to be guided and formed by their example and instruction ; and learn from them how to use their reason, and to act uprightly. Thus they may become worthy people and good citizens, and be enabled to lead an honest and happy life. Possessed of such advantages, we may easily dispense with those which the animals appear to have over us. We have no need of furs or feathers to clothe us ; no need of teeth and talons to defend us, nor of certain natural instincts and sensations to procure us the things necessary to our support and preservation. These gifts of nature would only degrade us, and bring us into a state of mere animal perfection. Our senses, our reason, and our hands, suffice to procure us clothing, weapons, food, and every necessary for our safety, support, and pleasure ; and enable us to apply to our use all the riches of the kingdom of nature.

We see, therefore, that the wants of which so many complain, are the very foundation of our civil happiness ; and the best means which the wisdom and goodness of God could choose to direct the faculties of men to their greatest advantage. Were they only wise enough to exercise themselves in this way, they would save themselves a great deal of trouble. Not one in a hundred of the miserable could attribute his distresses to misfortune ; and we should confess, that the quantum of good far exceeds the quantum of evil : that our afflictions are softened by a thousand advantages ; and that it is in our power not only to lead a tolerable, but even a happy life.

OCTOBER XXX.

ON PRESENTIMENTS.

THE faculty which our souls have of foresight, manifests itself by such extraordinary effects, that it must strike us with astonishment. The sensations and representations which foresight produces, are

On presentiments.

sometimes so obscure and wrapped up in the essence of the mind, that we are not conscious of them. The soul, however, draws very exact conclusions from them ; and the image of the future presents itself clearly enough to convince the mind that has that preconception. It then forms conjectures and presages without knowing how it has been led to them, and in its astonishment often mistakes them for inspirations. This is what is called *presentiment* ; when, without being able to account for the way in which we foresee a future event, we have, notwithstanding, an idea more or less clear of it. But it should be here observed, that *presentiment* is, in its nature, a representation much weaker than *sensation* ; therefore it cannot be well distinguished when the senses and a heated imagination put the soul into a violent agitation. But when the soul is calm, *presentiments* are more clear : hence it is, that they take place chiefly in the silence of the night, in sleep, and in dreams. At such times, man is often raised above himself ; the veil which covers futurity is drawn from before his eyes, without his knowing how it was done ; and he can speak of future events, while he is scarcely able to see those which pass before his eyes.

A multitude of facts prove, beyond a doubt, that the soul has the faculty of sometimes foreseeing the future : and he must have a slight acquaintance with nature, who would deny a thing merely because it appears extraordinary, or inexplicable. This secret and unknown emotion, which warns us sometimes of what is to happen, really exists in the essence of our souls ; and history is so full of examples of this, that we cannot possibly deny them all. Few persons have arrived at mature age without having had some such presentiments. The soul is a representative power of the universe, in reference to the place it occupies in it : it has the faculty of representing the past as well as the present, why then may it not have the faculty of representing the future also, and even contingent events ? It may employ, for this purpose, means similar to those which it uses to represent the *past*. Provided it have been informed of past events, it can represent them as if they were present : and why should we consider it an impossible thing that it should be informed of future events ? In the universe there are millions of intelligences superior to man, who may reveal to him some part of futurity : or there may be in the human soul a certain power hitherto unknown, which enables man to foresee distant and future events.

But however obscure and inexplicable the cause of presentiment may be, it is enough for us to know that it may contribute, in a direct or indirect manner, to our happiness. At one time it may warn us of our approaching danger : at another time it announces some pleasing and happy event. In both cases this presentiment may be very advantageous to us : we have only to take care that this faculty of our soul become not our torment, but that it serve, on the contrary, to establish and increase our tranquillity. We must particularly guard against all superstition : we must not trust too much to these *presen-*

On presentiments.

timents, nor draw rash conclusions from them. They must not lead us to neglect the performance of any duty ; and we must never forget, that God alone deserves all our confidence.

OCTOBER XXXI.

A HYMN ON THE POWER AND PROVIDENCE OF GOD.

GOD is my song. He is the strong God ; the Lord is his name, his works are great, and his government extends to the heavens.

He wills and speaks, and millions of worlds spring into existence : he threatens, and worlds are reduced into dust.

Light is his garment ; his counsels are wisdom and truth. As God he reigns ; truth and righteousness are the foundation of his throne.

Monarch of all the world ! Who is like unto thee ? Without beginning of days, or end of time ! The only, the never-ceasing source of glory, riches, and happiness !

All that is, was, or shall be, in heaven, earth, or sea, is known by the Lord. His innumerable works have been before his eyes from eternity.

He encompasses me ; he watches over me ; and under the shadow of his wings I rest in safety. None of my actions can escape his notice : he searches the heart.

He is nigh to thee ; he knows thy rising up, and lying down : he sees thy thoughts long before they are formed. Shouldest thou climb up to heaven, he is there : shouldest thou fly on the rays of light to the limits of the universe, he is there also.

He knows my troubles ; he hears my prayers ; he understands all that passes in my heart. My good and my bad actions are equally known unto him ; and when I stumble, his merciful hand upholds me.

From eternity he has prepared my welfare : whatever concerns me is written in his book ; his finger marked it down before I was born : as also the number of my days.

I have nothing but what has come from God !—Lord, I am thine ! It is by thy goodness I live. Therefore I will give glory to thy name, and thy praise shall be eternally in my mouth.

Who can comprehend and recount the grandeur and magnificence of thy wonders ! Every grain of dust announces the power of its Creator.

Thy wisdom is seen in the smallest spire of grass : air, sea, fields, valleys, and hills, proclaim thy praise.

Thou waterest the earth, and spreadest a verdant carpet under our feet : we are encompassed by thy mercies : the day and the night, the corn and the fruit of the vine, plenty and joy, all come from thee.

A hymn on the power and providence of God.

A sparrow falls not to the earth without thy notice :—then shall I abandon my heart to vexation, and not confide in thy paternal care ?

If the Lord be my protector, my sun, my shield, and my deliverer, I have nothing to fear from heaven nor from earth ; nor shall all the powers of hell cause me to tremble.



NOVEMBER.



NOVEMBER I.

A HYMN OF PRAISE.

THOU, O Lord, hast created the hosts of heaven ; and the blessed spirits which encompass thy august throne. The heavens, in their immense extent, and all the magnificence with which thou hast adorned them, are only the tabernacles of those sublime intelligences, which know and adore *thee*.

Thou hast adorned this globe of earth with a thousand beauties which enchant the mind. The sun which illumines these worlds, fertilizes the earth, and enriches it with so many benefits, is so established by thee that he cannot be moved.

At thy command, the moon, the flambeau and ornament of the night, favours us with her mild light. Wherever we look, wherever we go, we see new proofs of thy goodness : on us thy blessing continually rests.

Springs and unfailing fountains babble forth in our behalf, and furnish us with limpid and wholesome water. The gentle dew waters and refreshes our meadows. Mountains and valleys, forests and fields, present us with a thousand thousand* beauties. The whole earth, which thy hand supports in the immensity of space, is full of thy riches, crowned with thy goodness, and fertilized by thy bounty.

Let us bear, without murmuring, the afflictions of life ; frequent blessings, and especially the blessed hope of eternal felicity, shall assuage our griefs. The magnificent spectacle of nature shall reanimate us, and the beams of his grace shall dry up our tears.

But who can fathom the depth of thy ways ! In this life, good and evil walk side by side : earthquakes, thunder, tempests, war ; contagious and innumerable maladies, disturb the repose of mortals :—we shall fall before death : he spreads devastation every where, and respects no person.

A blast overturns us, and precipitates us into the tomb, and we are reduced into dust. But, everlasting thanks be to God, we expect a new life through the Lord Jesus, who has conquered death, and brought life and immortality to light by his Gospel.

NOVEMBER I.*

MARINE ANIMALS.

AT first it seems difficult to believe that living creatures could be found in the sea. It contains so many different kinds of plants, herbs, trees, and bushes, which so grow and twine together, that this must apparently render the paths of the great deep impassable, as nothing but confusion and disorder seem to reign in that extensive wild. But can there be in the sea living creatures, connected with each other? Nothing is more true, how strange soever it may at first sight appear. And it is not some individuals only that the sea contains, but such an innumerable multitude of different *kinds*, that we are very far from knowing them all, much less can we tell the *individuals* which belong to each species.

Among this innumerable multitude of animated beings there is no confusion; they may be all easily distinguished; for in the sea, as well as every where else, the most perfect order prevails. All these creatures may be ranged in certain classes: they all have their particular nature, food, manner of life, characteristics, and peculiar instincts. In the sea, as well as upon the land, there are gradations, shades, and insensible steps from one species to another. One begins where the other ends. The stone which is at the highest step of the ladder in the mineral kingdom, is one half of it a plant. The plant which terminates the vegetable kingdom, belongs, in part, to the animal kingdom: and the beast which connects the human and the brute creation, has a great resemblance to man. So likewise in the sea, nature passes gradually from little to great; perfects insensibly the different kinds, and unites all beings by an immense chain, which is not deficient in a single link.

What a prodigious multitude of inhabitants must the sea contain! What a variety is there among them! What a diversity in their forms, instincts, and destination! Some are so small that they can be scarcely perceived; others are so large that we are terrified at their enormous bulk. Some are entirely without ornament, and so like the sea in colour, that it is almost impossible to perceive them in that element. Nature has adorned others with the most vivid and magnificent colours. Some kinds do not multiply much, because, if they did, they would devour and destroy all the rest. Others, on the contrary, multiply prodigiously, because they serve for food to men and other animals.

Lord, how numerous are thy works! In wisdom thou hast made them all: the earth is full of thy goodness, so is this great and wide sea, wherein are creatures innumerable, both great and small animals. There go the ships; there are the great whales which thou hast formed to sport therein. These wait all upon thee, that thou mayest give them their meat in due season. *Psa. civ. 24—27.*

The connexion of natural things.

NOVEMBER II.

THE WISDOM OF GOD IN CONNECTING ALL PARTS OF NATURE.

AS all the members of our bodies, taken collectively, form but one whole, constructed and arranged in the utmost wisdom ; in like manner, the different kinds of natural productions are so many parts out of which the Supreme Wisdom has formed one perfect whole. A little attention only is necessary to convince us that every thing in nature is connected so as to form a perfect system. Different kinds of mineral earths manifestly nourish and support the vegetable kingdom, without which, animals could not exist. Fire, water, and air, are indispensably necessary for the preservation of this terrestrial globe : there is, therefore, an indissoluble bond between all the beings of which our globe is composed ; and philosophers have demonstrated that the globe itself has a necessary connexion with the sun, the planets, and the whole creation. Now, to connect together this infinite multitude of different beings, and to form but one *whole* out of all these parts, required unbounded wisdom. This alone could connect so many millions of different creatures, and unite them in such a manner, that they should subsist in continual relation to each other, and minister to each other's support.

That we may not lose ourselves in this immense ocean of creation, let us only consider our own globe, which is one of the most considerable parts of the universe. The wisdom we discover in it will enable us to judge of what is manifested in the rest of creation. At present let us reflect only on what is before our eyes. If we examine the animal kingdom in the relation it has to the rest of nature ; if we reflect on the wants which are common to all the animals, we cannot but be struck with the admirable harmony which we discover in it. Heat, air, water, and light, are absolutely necessary for the preservation of all creatures. But there must be a just proportion of them. Too much or too little would be equally injurious, and make a general chaos of nature. One degree too much in the universal heat would destroy every living creature. For if our earth, taken in the whole, received more heat from the sun, it would necessarily follow, that the summer would be hotter in every climate than it is at present. But experience tells us that in all countries the heat is sometimes so great, that were it to be increased a little, either in degree or duration, all the animals must perish, and all the vegetables be burnt up. On the other hand, if we had less heat we should be equally injured ; seeing at present the cold is sometimes so intense, that many animals are in danger of being frozen to death : and it is not an uncommon thing to see some killed by the severity of the cold. The earth, therefore, receives that degree of heat from the sun which is proper for all the creatures, and any other degree would be destructive. There is the same just proportion in the air. The ascent of vapours depends chiefly on the *weight* of the air, and

 The connexion of natural things.

the descent of rain on its *lightness*. Now if the air could not condense and rarefy itself alternately, and become at one time heavy, at another time light, we should not have that diversity of temperature which is so necessary for the vegetation of plants, and consequently for the life of animals.

Were the air in general more *weighty* than it is, it would be more laden with vapours, clouds, and fogs; and through its excessive humidity would be injurious to plants and animals. If, on the contrary, it were *lighter*, the vapours could neither ascend nor collect in clouds. It is the same every where. Nature observes a just medium in all things; and as all the elements are so arranged as best to secure the preservation of animals, so they are in perfect harmony with all the other parts of nature. The air not only produces those variations of temperature which are so necessary, but it is at the same time the vehicle of *sound*. It has been appropriated to our ear, and here again a marvellous wisdom is manifested: for if the air were more or less *elastic*; were more *dense* or more *rare*; the ear would suffer by it greatly; and the soft and pleasing voice of man, would either resemble claps of thunder, or the hissing of serpents. The air also contributes to the circulation of the blood: it penetrates the very smallest ramification of the veins: were it more *dense*, its force would break every thing: were it more *rare* its action would be too weak. There are a thousand other relations between the air and different beings; and it has all the properties that each requires.

Now if we consider that many thousands of plants and animals have equal need of air, heat, and light; that each of these species is different from the others; that it has its distinct and peculiar characteristics; that it is weaker or stronger than others; and that, nevertheless, these elements are equally suited to all, and supply their different wants; shall we not acknowledge that an unbounded wisdom, to which nothing is difficult, has established these admirable and harmonious relations among so many different beings? In a word, every thing in nature is made in number, weight, and measure, and directed to the accomplishment of determinate ends. Not only the trees which rise so majestically, the plants which have such beautiful forms, the fruitful fields and meadows, the serviceable horse, the flocks which feed us, the mines which produce so many ornaments and so many riches; the sea, which garnishes our tables with such exquisite fish; and which conveys navigators from one part of the world to another; the planets which have such influence on our globe; not only, I say, those brilliant parts of the creation, but even the *mosses*, the *shell-fish*, and the *insects*, all contribute to the perfection of the whole.

Infinitely powerful Being! Creator and preserver of all things! can I contemplate these objects without thinking of thee, and admiring thy wisdom! Without thee, without thy salutary influences, all would be in darkness, confusion, and disorder: there would be neither connexion, harmony, nor pleasure upon earth.

“Yes, Lord, it is thy wisdom which adorns, enriches, and supports all things. It is thy wisdom which gives life and happiness to the animal creation. Let it ever be the subject of our songs. May we praise thee incessantly, O our God, and sing hymns to thy honour; for to thee appertain both wisdom and strength.”

NOVEMBER III.

BED.

PERHAPS in summer we have not been so sensible as we ought of the comforts of a *bed*: but now that the cold daily increases, we begin to consider this as one of the particular blessings which we receive from the kindness of God. If we were deprived of it in these cold nights, perspiration could not be carried on so well; our health would be impaired, and our sleep would not be so comfortable and refreshing. On this account, bed is a considerable benefit to us. But whence comes that warmth which we feel in it? We mistake if we suppose it is the bed that warms us: far from being able to communicate any heat to us, it is from our bodies which it receives its warmth. It only prevents the heat, which evaporates from our bodies, from being dissipated in the air: it confines and concentrates it.

We shall be more sensible of this blessing, if we consider how many creatures concur to procure a quiet sleep. How many animals must furnish feathers and hair for this purpose! Supposing that a common bed contains *fifty-six pounds* of feathers; and that one goose produces about *half a pound*: the spoils of *one hundred and twelve* geese will be necessary for one bed! But it requires many hands and materials besides. Now, by such calculations as these, we may learn the better the value of God's blessings. Generally we consider the blessings he communicates in a very superficial manner: but if we examine them in detail, we shall form a different opinion of them from what we commonly do. Let us consider the different parts of which our bed is composed, and we shall be astonished to find that it requires the labour of *ten men* at least; that it has cost the lives of as many animals; that the field must furnish flax for the sheets and quilts; sheep, wool for the blankets; the forests, timber for the bedsteads, &c. We see then that a considerable part of the creation is put in motion to afford one refreshing night's rest.

We may make the same reflections in the most common daily blessings we enjoy. Our linen, clothes, shoes, and stockings, meat, drink, in a word, all the necessaries of life, can only be procured for us by the united labour of a multitude of persons. Can we then lie down in our beds without feeling sentiments of gratitude? At the conclusion of each day we have a thousand other subjects of praise to God: but had we only this, it would deserve our utmost gratitude.

Bed.

What sweet repose, what comfort, do our beds afford us after the fatigues of the day ! In these cold nights the best warm room would by no means answer so good an end to us as a bed. A warm apartment can give only an unequal heat ; whereas the whole body is equally warmed in bed, and that with the most temperate degree of heat. By means of this we can procure ourselves, at little expense, the warmth, comfort, and rest, which are requisite. If then it be a mark of irreligion for a man to sit down to food without giving God thanks, it is more so to lie down in bed without being thankful to him : seeing the refreshment which our bed affords us is of longer duration, less expensive, and not less necessary for our health. Let us, therefore, bless God for this enjoyment, and never forget the excellence of the blessing. We should be the more thankful, when we consider how many of our fellow-creatures either have no beds to rest on, or cannot rest on them. These distressed people highly deserve our pity. How many are exposed to the open air, in all the inclemency of the season, travelling either by land or water ? How many confined in prisons, or in wretched cabins, who long for rest, and would think themselves the happiest of mortals had they but a small part of the blessings which we enjoy ?

It is not unreasonable to suppose that the hundredth part of the inhabitants of a town or city are found in such distressing circumstances as these. What advantages have we over them ! How many of our fellow-creatures are obliged to watch the whole night ! The soldier at his post, the sailor in his ship, &c. But how many are there, who, though they have beds, cannot find rest on them ! In the compass even of a few miles, how many sick persons are there whose pains prevent them from sleeping ! And others are kept awake by carking care. Sinners, by remorse of conscience, are deprived of the sweets of sleep : with many other wretched people, whose secret afflictions and poverty, together with their anxiety for the future, do not permit them to take the least repose. Now what is our duty in reference to them ? If we have not the ability to supply their wants, and assuage their pains ; let them at least share our compassion, and have an interest in our prayers. As often as we seek rest in bed, let us pray for those who are deprived of it ; either through sickness, anxiety, poverty, or any other cause of distress. Let us especially remember those who are obliged to lie on the bare ground. Let us think also of our sick and death-bed. We shall not always sleep as comfortably as we do at present. Nights may come in which we may water our couch with our tears ; and in which the pains of death shall compass us about. But even these shall be followed with a peaceable rest in the grave. If we sleep in the Lord, we shall awake again with new energy ; and contemplate the glories of our God. Let us, therefore, in the days of health and prosperity, think of this last bed, our bed of earth ; and let us live so as to be able to think of it with satisfaction and joy.

NOVEMBER IV.

REFLECTIONS ON THE PAST SUMMER.

THE fine days are gone ; and, except the pleasing recollection of having enjoyed them, they leave us nothing but emblems of frailty. How is the whole face of nature changed ! The rays of the sun fall faintly through the gloomy clouds, on gardens stripped of their flowers, on fields where no traces of crops remain, and on hills where little verdure is to be seen. The air no longer resounds with the melodious singing of birds, and the gloomy silence which reigns every where is only interrupted with the croaking of jackdaws, or the shrill cries of those birds of passage which now take their leave of us in order to seek a warmer climate. The surrounding mountains are deserted ; they are no longer covered with flocks, nor enlivened with the bleating of the sheep : the hotbeds and parterres are laid waste. What a gloomy and dismal aspect does the whole country wear which was lately so beautiful ! Instead of that lovely verdure, the principal ornament of the fields ; they present little to the eye but a pale and dismal yellow. The clouds are laden with cold rain, and the thick mists veil the serenity of the morning.

Such are the prospects which nature now presents ; and who can view them without reflecting on the frailty and inconstancy of all terrestrial things ? The fine days are gone : just while we were preparing to enjoy them, they are fled away ! But have we a right to murmur and find fault with the dispensations of the Lord ? No, certainly : we should rather recollect these summer days, and the innocent pleasures with which they have been crowned ; and return praise for them to the Ruler of seasons. What sweet sensations have been impressed on our hearts ; with what pure joy have our souls been filled, when we contemplated the beauties of nature ; when the mountains and the valleys grew green before our eyes ; when the lark in the luminous clouds, and the nightingale in the shady thickets, caused their harmonious notes to be heard : when we respired the sweet perfumes of the flowers ; when the dawn, immediately succeeding the twilight, diffused joy and gladness around ; and when the setting sun tinged the forests and hills with the most beautiful red ! What happy days have we spent in the enjoyment of beauteous nature ! What rich presents have been made to us by the gardens, orchards, and fields ; exclusive of the pleasures which our imagination and senses have received from them ! Can we think of the past months without feeling a sweet emotion, and without praising the Parent of nature, who has crowned the year with his goodness ?

We now live on the gifts of summer and autumn. We have seen with what activity nature laboured, in those fine seasons, to accomplish the beneficent views of the Creator in the behalf of man. How many plants and flowers has spring thus produced ! What crops of fruits has summer ripened : and what an abundant harvest has been

collected in autumn ! The earth has now fulfilled its design for this year, and is going to repose for a short time. Thus nature is continually employed during the greatest part of the year : even in her rest she is active : and in silence prepares a new creation. Have *we* been equally active ? Have *we* employed our time so as to bring forth fruit ? The husbandman now counts his sheaves : should *we* not be able to reckon some virtues, some good works ? Have the pleasures of summer rendered us better and more grateful ? Has a contemplation of nature excited us to lift our hearts to God ? What have our occupations been during the long summer days ? Have they contributed to the glory of God, and the good of our fellow-creatures ? In contemplating the sun, the flowers, and so many delightful objects, have we felt those sentiments which such magnificent scenes are calculated to excite ? Are we conscious that this summer has not, like many others, been lost upon us ?

We are still blest with life ; and can reflect on the spring and summer which are just elapsed. Can all those who have seen the first of May, say as much ? Alas, many of them before the end of the summer ; yea, even before it began, have passed from the land of the living into the empire of the dead. It is right, O our God and Preserver, that we should bless thee for our continued existence. But we also shall soon depart ;—and possibly we have seen our last summer ! And what shall become of us, if we be called to give account of the manner in which we have spent the past ?—Enter not into judgment with us, O God !

NOVEMBER V.

INCONVENIENCIES OF THE NIGHT.

AT this season the nights continually increase in length ; and it cannot be denied but this arrangement is, in some respects, disagreeable. For although a part of the night is appropriated to strengthen and refresh us by sleep, this very circumstance points out to us the weakness and frailty of our nature. Hence it is, that at the commencement of the night, all our employments are interrupted, not only from the want of light, but also from the necessity of repose, and from the animal strength and spirits being exhausted. It is no wonder therefore, that the hours of the night should appear so long and tedious, especially when we are restless and cannot sleep.

With what impatience does the sick man count the hours, and long for the rising of the sun !—Another inconvenience of night is, that we are exposed to lose our way and meet with disasters. When the light of the sun is withdrawn, and the shades of night veil the sky, we cannot see where we walk ; we are every moment stopped, and make false steps. How many travellers wander in the night time ; get into bad roads, among briars and thorns, bogs and pits, and by fall-

Inconveniencies of the night.

ing over precipices meet with instant death? Besides, during the night we are exposed to attacks, either in our own houses or on a journey, by wicked and perverse men; for the darkness of the night is favourable to all sorts of crimes, encourages the disturbers of the public peace, and veils their transgressions from the eyes of men. What renders the nights still further inconvenient is, that they are *cold*: for when the sun is set, and his rays are withdrawn, one half of the globe is deprived of his vivifying heat, as well as of his light, and this renders the long winter's nights very disagreeable. We may add to all this, that night, by its regular return, presents us continually with a new emblem of death.

There is neither constant night nor day upon the earth: and although the time of darkness in winter is long; and that even during the summer, the regular returns of darkness cause the division of days, it is nevertheless certain, that God has given our globe more light than darkness; an advantage which we enjoy by means of the twilight, and by the light of the moon and stars. Blessed be the Lord for the light of the moon and stars! Blessed be his name for the light of the sun, and the splendour of noonday! But more especially may his name be magnified for the light which his Gospel has diffused over the dark night of ignorance, error, and misery! Some rays from the heavenly world fall upon us and enlighten us in the dark path in which we walked! Let us remember, that in our most obscure nights, in our times of sorrow and distress, we are marching to the region of light and joy. Should it sometimes happen that sleep forsakes us in the midst of the darkness of the night, and that sickness or perplexing cares cause us to reckon the melancholy hours, let us comfort ourselves with this thought, that we are not buried without hope in the darkness of an eternal night, but that we are advancing towards our heavenly country, towards those blessed mansions where there is no night, no alternatives of light and darkness, no sorrow nor anxious care.

Blessed be God that the night of ignorance, darkness, and distress, with which we are encompassed here below, is not an eternal night! Heaven and an endless glory will soon be the portion of the righteous. Sun and moon, and ye radiant stars which blaze in the firmament, hasten on and finish the race set before you! Increase your speed, that the time of trial, the revolutions of day and night, of months and years, which are assigned me may be terminated. May the light of faith enable me to discover the dawn of that great day, when all the nights and darkness which surround me shall end for ever! Morning of eternity, haste thy appearing; that all my hopes may be realized! I long to arrive in those blessed mansions of that permanent city where there is no night; but where an everlasting day shall incessantly perfect our knowledge, our holiness, and consequently our felicity!

NOVEMBER VI.

REFLECTIONS UPON WOODS.

WOODS form one of the most beautiful pictures which the surface of the earth presents to the eye. It is true, that at first sight they are unadorned beauties ; for we see at first only a confused collection of trees, and a dreary solitude. But an enlightened observer, who terms every thing beautiful which is good and useful, finds in such sights a thousand things worthy his attention. Let us, therefore, visit the forests, they will furnish us with many subjects of admiration and gratitude.

Now that the walks in the fields and meadows are not so pleasant as they were in the summer, the forests are more interesting, and will yield us solid pleasure. For there is no place that invites us more to meditate on the grandeur and beauty of the works of nature than a lonely wood : the pleasing obscurity, and the profound silence which reign there, lead us to recollection, and awaken our imagination.

The multitude and variety of trees are the first things which attract our attention. They are not so much distinguished from each other by their height as they are by their manner of growth, their leaves, and their texture. The resinous *pine* is not remarkable for the beauty of its leaves ; they are narrow and pointed, but they last long, like those of the *fir* ; and their verdure, during the winter, recalls to our memory the beauty of the summer months. The foliage of the *lime* tree, the *ash*, and the *beech*, is much more beautiful and varied. The verdure of these is admirable : it relieves and strengthens the sight : and the broad indented leaves of some of them form an admirable contrast with the narrow fibrous leaves of others. Their seeds, manner of being propagated, and the use of their fruit, are as yet but imperfectly known. But to what a variety of purposes may the timber of trees be applied ! The *oak*, the growth of which is so slow, and which only begins to put forth its leaves when other trees are adorned with them, furnishes the hardest wood, out of which the joiner, the cabinet-maker, and the carver, know how to form a variety of works, which are so durable as even to defy, in some measure, the wastes of time. Lighter wood serves for other purposes : and as it is more plentiful, and grows quicker, it is of more general use.

It is to forest trees we owe our houses, our ships, a part of our fuel, a thousand moveables, and a thousand important articles of furniture. Wood is the principal matter, or most natural pabulum of fire ; without which, in many countries, men could neither prepare their food, nor carry on their manufactures. The industry of man has taught him to polish, turn, cut, and carve wood into a multitude of works, as elegant as they are durable. The divine wisdom has distributed forests with more or less abundance over the whole earth. In some countries they are at a great distance from each other : in others they

Reflections upon woods.

occupy many leagues, and raise their majestic tops to the clouds. A scarcity of woods in some countries is compensated by their abundance in others. Neither the continual use which men make of them, nor the ravages of accidental fires, nor the vast quantities consumed in severe winters, have yet been able to exhaust these rich gifts of nature. In the space of twenty years we see a forest, where we had before discovered some low copse, or a few scattered trees.

Do we not plainly see in all this the power and goodness of our heavenly Father? How superior is his wisdom to ours! If we had assisted at the works of creation, probably we should have formed many objections to the production of forests; we should have preferred orchards and fertile fields. But that Being who is infinitely wise, has foreseen the necessities of men in all possible circumstances. And it is in those very countries where the cold is most intense, or wood is needed for navigation, that the largest forests are found. From their unequal distribution, a considerable branch of commerce results, and new connexions are formed among men. Each of us partakes of the numerous advantages which woods afford to men; and in creating forests God has designed the particular good which results to each. Blessed be thou, our heavenly Father, who hast condescended to think of us before we felt our necessities, or could represent them to thee! In every thing thou hast prevented our wishes, and liberally provided for us! May we answer the end for which we were formed, and for which we have received so many benefits, and pay that tribute of gratitude, love, and praise, which is so justly thy due!

It is not left to man to plant and maintain forests. All other goods must be acquired by labour. The ground must be ploughed, and the seed sown at the expense of much trouble and toil. But God has reserved the trees of the forests to himself; he has planted, he preserves them; and man has little to do in their cultivation. They grow and multiply independently of his care; they repair their losses continually by new shoots; and there is always enough to supply our necessities. To be convinced of this we have only to cast our eye upon the seeds of the *lime tree*, the *maple*, and the *elm*. From these little seeds vast bodies are produced, which rear their heads to the clouds. It is thou alone, O Lord God Almighty, who hast established them, and hast supported them for ages against the efforts of winds and tempests! It is thou who sendest dew and rain sufficient to make them renew their verdure annually, and to keep up a kind of immortality among them.

The earth which bears the forests does not produce them; and we might even say, that it does not nourish them. The verdure, flowers, and seeds with which trees are annually covered, and of which they are annually divested; and the sap which is continually dissipated, are losses which would, in time, exhaust the earth itself, if it furnished the matter for them. Of itself it is a dull, heavy, dry, and barren mass, which derives from other quarters the juices

and nourishment which it communicates to plants. The principles of their growth do not proceed from the earth ; but the air, without assistance, furnishes an abundance of water, salt, oil, and fire, and all other matters which are requisite for the growth of trees.

O man ! laden with so many benefits, raise thy heart to that great Being, who delights to do thee good. Woods and forests are heralds of his bounty, and thou must be guilty of the greatest ingratitude if thou neglect to acknowledge this benefit, which almost every part of thy house must recall to thy memory.

NOVEMBER VII.

THE SENSE OF FEELING IN ANIMALS.

WE may say with truth, that *feeling* is the universal sense of animals : it is the basis of all other sensations : for *seeing*, *hearing*, *smelling*, and *tasting*, cannot exist without *contact*. But as the *touch* operates differently in *seeing* from what it does in *hearing*, and in *hearing* from what it does in the other organs of sensation, we may therefore distinguish the sense of *feeling*, properly so called, from the universal sensation which we have already noticed. Both are produced through the medium of the nerves. Of these anatomists reckon *ten* principal pair ; they are like small cords or threads, and derive their origin from the brain : and are distributed through every part of the human body, even to the very extremities. Wherever there are nerves there is sensation : and wherever the seat of any particular sense is found, there are also nerves which are the general organ of that sense. There are *optic* nerves for the *eyes* ; *auditory* nerves for the *ears* ; *olfactory* nerves for the *nose* ; *gustatory* nerves for the *tongue* ; besides the nerves which minister to *feeling*, and which, like that sense, are distributed over the whole body. All these nerves proceed from the spinal marrow, pass through the lateral opening of the vertebræ, and distribute themselves by innumerable ramifications to every part.

The nerves which minister to feeling are found also through all the organs of the other senses ; for these organs, independently of their own peculiar sensations, must be susceptible of feeling. Hence it is, that the eyes, ears, nose, and mouth, receive impressions which depend entirely on *feeling*, and are not produced by their own particular nerves. That sensation is occasioned by the interposition of the nerves is indisputable ; for every member feels more strongly in proportion to the number of its nerves : and feeling ceases where either there are no nerves, or the nerves are cut off. Incisions may be made in the fat ; bones, nails, and hair may be cut off, without exciting any pain : or if we think we experience any, it is the mere effect of imagination. The bones are encompassed with a nervous membrane, and the nails are attached to places where there is a *plexus*

or tissue of nerves : and it is only when one of these nerves is irritated that we feel the sense of pain. Therefore we cannot with propriety say, *my tooth aches* ; for as it is a bone, it can have no feeling, but the nerve which is attached to it may feel pain when too much irritated.

Let us here admire the wisdom and goodness of God. In thus diffusing the sense of feeling over the whole body, he has evidently had our well-being in view. The other senses are situated where they may best accomplish their functions ; and serve for the preservation of all the members. Now as it was necessary for the security and welfare of the body, that each part might be informed of whatever may be useful or injurious, pleasing or disagreeable to it ; it was also necessary that the sense of feeling should be diffused over the whole body. It is another proof of the Divine Wisdom, that several animals should have the sense of feeling in a more exquisite degree than men have, as that delicacy of feeling is necessary for their manner of life ; and compensates them for the privation of some other sense. The horns of the snail, for instance, have the most exquisite sensibility ; the least obstacle causes them to draw them in with the utmost readiness. How delicate also must the feeling of the spider be, when in the midst of that web it has so ingeniously woven, it can perceive the least motion which the approach of other insects may occasion !

But without dwelling on the sense of feeling in animals, it will sufficiently excite our admiration if we consider this sense as it exists in man. How can the nerves (which appear to be only susceptible of less or more length, breadth, tension, and vibration) transmit to the soul so many different kinds of ideas and sensations ? Can there be such a correspondence between the soul and body, that nerves of a certain determinate size, structure, and tension, should always produce certain sensations ? Has each organ of sense, nerves so arranged and adjusted, so analogous to the corpuscles, or small particles of matter, which emanate from bodies, that the impressions which they receive from them should be always followed with certain determinate sensations ? It seems, at least, that the pyramidal form of the nervous papillæ, which are the immediate instruments of taste and feeling, gives some probability to this conjecture. But our knowledge is too limited to decide on this point, and we are obliged humbly to acknowledge that this is one of the mysteries of nature which perhaps cannot be fathomed in this life.

Let us give God thanks, that with all other senses which his goodness has bestowed upon us, he has also given us the sense of *feeling*. Of how many pleasures should we be deprived if our bodies had less sensibility ! We could not then discern fully what would be advantageous to us, nor shun what would prove injurious. How well would it be if our souls had as lively a sense of what is excellent and honest, and as decided a taste for holiness, as our bodies have for pleasure ! This moral sense was in the beginning impressed on our souls :

Sense of feeling in animals.

but alas ! it is almost obliterated : and how deplorable must our state be if it be totally and finally lost ! Great God ! preserve us from so great an evil !

NOVEMBER VIII.

A RECOLLECTION OF THE BENEFITS WHICH WE HAVE ENJOYED IN SPRING
AND SUMMER.*

COME, my friends, let us feel and acknowledge the goodness of the Creator. Let us think, with gratitude, on the time we have spent in the bosom of joy ; while exempt from inquietude and trouble, renewed nature filled us with delight ; when devotion followed us to the green bowers, and when even the shadow of sorrow disappeared from our habitations ; when, hand in hand, we traversed the flowery paths, every where seeking and finding the Creator. When from the thick bush, whose foliage had invited the ærial songsters, their melodious notes reached our ears, while peace, friendship, and innocent joy abundantly heightened the pleasure. Smiling nature dealt out our flowers with a liberal hand ; we breathed the balsamic odour of *roses*. The *pink* and the *wallflower* perfumed the air around us, and towards the evening of a fine day, the sporting zephyrs wafted us the sweetest exhalations on their airy wings. Then our souls felt a sweet transport ; the opening of our lips was thanksgiving to the Lord, and under the rose-bushes we mingled our voices with the melodious concerts of birds.

Often when the gentle breeze had fanned the burning air of summer, and the birds felt themselves animated with new vigour ; when the azure clouds of the sky became dissipated, and the ruler of the day promised us his favours, pleasure lent us wings, and we cheerfully left the noisy abodes of the city to seek the green shades vaulted by nature. There we were undisturbed ; wisdom, piety, and innocent joy, accompanied us to the rural retreat, where we went to admire nature. The bushes, shaken with the evening breeze, afforded us a delightful shade, and diffused a refreshing coolness around ; and nature drew from unfailing springs the contentment which she pours into hearts that are pure. There, entirely given up to our Creator, to nature, and to reflections on our own happiness, our eyes were bathed in tears of joy.

The songs of gladness which resounded from every part of the forest, tuned our hearts to pleasure and gratitude. The joyous bleatings of the full-fed flocks, heard at a distance, the melodious notes of the shepherd's pipe, the dull buzzing of the beetle which fluttered among the flowers ; and even the hoarse and monotonous croaking of the frogs, warming themselves on the banks of the rivulet, all im-

* This paper is all in verse in the German.

 Benefits enjoyed in spring and summer.

pressed our minds with joy, and gradually elevated our souls to the Creator. There his supreme wisdom was manifested in the water, in the air, in the quadruped, the insect, and the perfume of flowers. A beautiful country, an emblem of that inhabited by our first parents, presented itself to our eyes. At a distance we perceived old and sturdy forests, and hills gilded by the rays of the sun. The pleasing mixture of the most diversified colours, the rural flowers, the golden crops, the rich green carpet wrought by the hand of nature, the treasures of the meadows, and the sweet aliment of the herds and flocks, which yield us their wholesome milk : the food of man as yet hidden in the tender ear, all these were objects sufficient to excite a feeling heart to glorify the Creator, and celebrate his bounty.

There nature spreads before us the majesty of her Author. The magnificent universe, we may justly say, is too beautiful to be the abode of inconsiderate, ungrateful man. For him the wings of the wind waste their refreshing breezes : for him the silver stream murmurs along, when at mid-day he rests from his labours : for him the corn ripens, and the trees bear their fruit ; all creation ministers unto him, yet HE is regardless of it !

But they who love their Maker, will discover in the breeze and in the brook, in the field and in the flower, in the spire of grass and in the ear of corn, the traces of his eternal wisdom : and to such universal nature is the herald of his power. That God who created the angels, has also given being to the grain of dust. It is by him that the *mite* lives, and the *elephant*, the burden of the earth. At the sight of a blade of grass, as well as the view of the aloe spike, a thinking mind will raise itself to the Creator ; for the *sprat*, as well as the *whale*, proclaims the grandeur of the Most High. Examine his works and answer me ;—Is he not as great in the *breeze* as in the *tempest* ? In the *drop* as in the *ocean* ? In the *spark* as in the *starry firmament* ? In the *worm* as in the *hyppopotamus* ? The vast creation is the sanctuary of God ; the world is a temple consecrated to his glory ; and man was appointed to be his priest in nature, and not the destroyer and tyrant of created beings.

NOVEMBER IX.

FOREIGN ANIMALS.

EVERY part of the world has animals peculiar to itself. And it is for very wise reasons that the Creator has placed some in one country rather than another. The most remarkable animals of the southern countries, are, the *elephant*, and the *camel*. In size they surpass all other quadrupeds. The elephant, especially, is like an animated mountain, and his bones are like pillars. His head is attached to a very short neck, and is armed with two kinds of weapons, with which, when necessary, he can even tear trees up by the

Foreign animals.

roots. Had his neck been longer it could not have supported the weight of his head, nor have kept it up. But to make amends for the shortness of the neck, he has a very long *trunk*. This he uses as a hand to carry his food to his mouth, without being under the necessity of stooping. He can not only move, bend, and turn this in all directions, as we do our fingers, but use it also as an organ of sensation; and it may be properly said of this animal, that he has his nose in his hand. His eyes are small in proportion to the size of his body; but they are bright and full of fire; and in them may be seen all his inward sensations and emotions. In his natural state the elephant, though wild, is neither sanguinary nor ferocious; he is of a gentle disposition, and uses his weapons only in his own defence. If he be not provoked, he does harm to no person: but he is terrible when irritated: he seizes his adversary with his trunk, jerks him like a stone, and then treads him to death. The elephant eats a hundred pounds of grass in a day; but his body being of an enormous weight, he bruises and destroys ten times more with his feet than he uses for his food. His principal enemy, and often his conqueror, is the *rhinoceros*, an animal resembling the wild boar, who uses the horn on his nose to tear up the belly of the elephant. It requires but little attention to discover the wisdom of God in the formation of the elephant: he causes it to be produced in a country abounding with grass; and he has taken care that it shall not become a burden to the earth by multiplying too fast, for the female goes *two years* with young, and does not couple with the male till *three years* after.

The *camel* is one of the most useful animals of the east. It is admirably adapted to bear the greatest fatigues among dry deserts and burning sands, as it is able to go four or five days without drinking, and requires but little food in proportion to its size. It crops the few plants and shrubs which grow in the desert; and when it can find none, about two quarts of beans and barley will suffice it for a whole day. Besides the hunch on its back, there is still another singularity in its make. It has two gullets: one terminates in the stomach, and the other in a kind of bag, which serves it as a reservoir to keep water in. Water continues in it without putrefaction; and when the animal is thirsty, or has occasion to moisten its dry food, or assist it in rumination, it throws up a portion of the water even to the *œsophagus*, which, having moistened the throat, descends afterward into the stomach. The ordinary load for a camel is from seven to eight hundred pounds weight: with which it can travel several miles in an hour; and continue for twelve or fifteen hours each day. The fleshy hoofs of the camel are made for walking in the sands; whereas the horny hoof of the horse would be hurt or burnt by them.

The most remarkable animals in the northern countries are the *elk*, the *sable*, and the *reindeer*. The first of these animals is large, strong, and well-shaped. His head pretty nearly resembles, in colour, shape, and size, that of the mule. His limbs are long and strong:

Foreign animals.

his hair of a light grey. This animal is simple, stupid, and timid. He finds proper food every where, but prefers the bark and young shoots of the *willow*, *birch*, and *service* tree. He is exceeding swift; and his legs being very long, he can pass over a great deal of ground in a short time.

The *sable* wanders in the forests of *Siberia*: and is very much prized on account of its beautiful fur. The hunting of this animal is generally the doleful occupation of the poor wretches who are banished to the deserts.

The *reindeer* is an animal of a pleasing and elegant shape, nearly resembling the stag. It seeks its own food, which commonly consists of moss, grass, leaves, and buds of trees. The inhabitants of the north derive the greatest advantages from it. They eat its flesh, drink its milk, and yoking it to a kind of sledge, are drawn by it with incredible swiftness over the ice and snow. All the wealth of the Laplanders consists in their reindeers. The skin furnishes them with clothes, beds, coverings, and tents: in a word, they derive from this animal all the necessaries of life.

What has been said of these foreign animals, may give rise to important reflections. How prodigious is the distance between the *elephant* and *mite*! And what a wonderful variety in the outward form of animals, in their shape, their organs, senses, motions, and manner of propagating their species: nevertheless, every thing is perfectly adapted and proportioned to the manner of life appointed them. But as there are animals in different parts of the world, which could not accommodate themselves to the air, climate, food, and temperature of European countries; so there may be millions of animals which could not exist on our globe, and which could no more live among us than we could in *Saturn* or *Mercury*.

O God! Thy empire is unbounded. Thou wouldst realize all kinds of life, and all possible happiness: and this plan, so worthy thy goodness, thou hast executed with infinite power and wisdom. May thy name be praised for ever and ever!

NOVEMBER X.

VARIETY OF WINDS.

THERE is a great variety of winds. In some places they are constant during the whole year, and always blow in the same direction: in other places they change at particular times, but always according to regular and fixed laws. In the open sea, between the tropics, and some degrees beyond them, there is an *easterly wind*, which continues the whole year without any considerable variation. To the north of the line, the wind blows towards the *north-east*, and to the south of the line, it blows towards the *south-east*, more or less, according to the position of the sun. But this should be understood of

 Variety of winds.

the wind that prevails in the open sea : for islands, and great continents which are in its way, may alter its direction, and cause it to become *north-east* in certain places. In the southern parts of the ocean, the wind is generally *westerly*. The nearer the coast, the more it varies ; and it is still more so on land. The constant east wind is chiefly owing to the heat which the sun communicates to our atmosphere. In the Indian sea, there are winds called *monsoons*, or *trade winds*, which blow in the same direction for three or six months together ; and then change, and blow in the opposite direction for the same length of time. The cause of these winds has not yet been accounted for in a satisfactory manner : but certainly we must look for it in the variations of heat and cold, in the position of the sun, the nature of the soil, the inflammation of meteors, the condensation of the vapours into rain, and other similar circumstances. There are both seas and countries which have winds and calms peculiar to them. In *Egypt*, and in the *Persian Gulf*, there prevails often during the summer a scorching wind, which prevents respiration, and consumes every thing. At the *Cape of Good Hope*, a cloud is often seen, which is called the *fatal cloud*, or *ox eye* ; it is at first very small, but visibly increases, till, in a short time, a furious tempest proceeds from it, which oversets ships, and plunges them into the depth of the sea.

Variable and constant winds, which have no determined duration or direction, prevail over the greater part of the globe. It is true that certain winds may blow more frequently in one place than in another : but this is not at fixed times : and they begin and end without any kind of rule. They vary in proportion to the different causes which derange the equilibrium of the air. Heat and cold, rain and fair weather, straits, capes, and promontories, may contribute much to interrupt their course, and alter their direction. There are, doubtless, many other causes of the different modification and alteration of the air, which are as yet unknown.

One thing particularly remarkable, and which always happens in almost every place, is, that a little before sun-rise, when the air is perfectly calm and serene, just at the dawn, there is a quick easterly breeze, which begins at the approach of the sun, and continues for some time after he is risen. This undoubtedly proceeds from the air being warmed by the rising sun ; and being rarefied, it drives the contiguous air easterly : this necessarily produces an east wind, which ceases afterward in proportion as the air around us becomes warm. For the same reason the east wind must not only precede the sun in the *torrid zone*, but also be much stronger than in our regions, because the action of the sun is more moderate with us than in the vicinity of the *line*. In the *torrid zone*, the wind blows almost constantly from east to west ; there a west wind very rarely happens.

We see then that the winds are not the effects of chance ; to which neither cause nor design can be attributed. In these, as in all other things, the Creator manifests his wisdom and goodness. He

Variety of winds.

has so arranged every thing, that the wind blows from time to time, and an absolute calm very rarely occurs. He regulates the motion, strength, and duration of the winds, and he prescribes the race which they are to run. Even their variety is very advantageous : when a long drought has caused both plants and animals to droop, a wind from the sea coast laden with many vapours, waters the fields, and revives nature. When this design is accomplished, a dry wind proceeds from the east, restores serenity to the air, and brings back fair weather. The north wind brings with it a great number of icy particles, and drives away the noxious vapour of the autumnal air. Lastly, to the keen north wind the south wind succeeds, which, coming from southern climates, impregnates the air with a reviving warmth. By these continual variations, fertility and salubrity are maintained on the earth.

Who can make these reflections without adoring God ? All the elements are in his hand, and his powerful word irritates or appeases them. When he commands, storms and tempests roar ; they rush from sea to sea, and from land to land ; and at his bidding, serenity is again restored. Should we not then be satisfied with our lot, seeing all our concerns are in his hand ? Cannot He who directs the winds, regulate also my lot ? Seeing that all the variations of the winds concur at his command, to promote the general welfare of his creatures, cannot he cause every occurrence in life to contribute to my present and eternal welfare ?

NOVEMBER XI.

THE CHASE.

HUNTING is one of the principal amusements of a certain class of men at this season ; but it were to be wished that less importance were attached to it. For the dominion which man has over animals, and the pleasure he takes in subduing them, is frequently mingled with cruelty. Sometimes, indeed, the death of certain animals is necessary, in order to make that use of them for which they were designed ; or to prevent them from multiplying so as to become injurious : but, even then we should kill them in the gentlest manner possible : but, unfortunately, this law of nature is very little attended to by the majority of sportsmen. Men, in this respect, show themselves more sanguinary than the most ferocious beasts. Is not the mode of *hare* and *stag-hunting* shocking to every feeling heart ? Can it be an innocent pleasure to pursue, with implacable fury, an innocent animal which flies before us in mortal anguish, till at length, worn out with terror and fatigue, it falls groaning, and expires in the most horrible convulsions ? Can human nature be unaffected at such a sight ? Can man behold this without some compassionate emotion ? To purchase pleasure by the death of an innocent creature, is to purchase

The chase.

it too dearly. It is a dangerous pleasure which habituates men to ferocity and barbarity : for it is impossible that the heart of a man passionately fond of hunting, should not sensibly lose the soft feelings of humanity. Such a person soon becomes cruel and sanguinary : he finds no pleasure but in scenes of horror and destruction ; and being accustomed to be insensible towards animals, he soon becomes so towards his fellow-creatures. Hunting does not appear to me to be an occupation which we can reconcile to the great duties we are called to fulfil. Without speaking of the loss of time, a loss in itself of great consequence, it is certain that hunting distracts the mind, and fills the imagination with ideas which are by no means compatible with serious occupations. Gentler amusements are more proper to divert and unbend the mind, than these turbulent pleasures, which almost deprive the soul of the use of reflection.

Hunting must ever appear a suspicious and dangerous employment to every moral and religious man. For ought we not to be afraid of a pleasure which gives place to so many irregularities and sins ? How much must the health suffer in such a violent exercise, and in such sudden transitions from heat to cold ? What excesses, what cruelties, what oaths, do such persons indulge themselves in ! How are the horses, the dogs, and even the men treated ! What mischief is there done to corn-fields and pasture ground ! Can all these evils be considered only as trifles which deserve no attention, and may be practised without scruple ?

Were we wise, we should seek more pure and innocent pleasures ; and surely such may be easily found. We have only to look around us, and we shall every where discover pleasing objects well calculated to afford us the greatest satisfaction. Heaven and earth, the arts and sciences, labour, our senses, the conversation of our friends ; in a word, every surrounding object, invites us to the enjoyment of pure pleasure. Why then should we run after gross and violent pleasures, which never fail to leave disgust and remorse behind them ? We have, within ourselves, an abundant source of enjoyment : a multitude of intellectual and moral faculties, the cultivation of which may every moment give us some new satisfaction. But it is in this alone, that the great science of a Christian and philosopher consists. Such have the art of being happy without much outward appendages or great expense. And they can always be so, without risking their virtue.

NOVEMBER XII.

DREAMS.

THE inactivity of our soul during sleep, is not so complete as to leave the faculties unemployed. We have ideas and representations, and our imagination is continually at work. This is the case when we dream. However, the soul has but little share in them, except so

Dreams.

far as relates to the memory : and perhaps this faculty belongs rather to the animal than to the rational soul. If we reflect upon our dreams, and examine why they are so irregular and unconnected ; why the events which they represent to us are so fantastic, it will be found that this proceeds chiefly from our being more affected by *sensations* than by *perceptions*. Our dreams represent to us persons whom we have never seen, or who are long since dead : we see them as alive, and associate with them things which actually exist. If the soul acted in dreams as it does when we are awake, a moment would be sufficient to set these unconnected and confused ideas in order. But commonly its attention is confined to the receiving and following the images which present themselves to it. And although these objects appear in the strongest light, yet they are always fantastically associated, and have no regular connexion ; for sensations succeed each other without the soul's combining or putting them in order. We have then *sensations* only, and not *notions* ; for notions can only take place when the soul compares sensations and operations on the ideas which it receives through the medium of the senses. Thus dreams are formed in the inferior faculties of the soul ; they are not produced by its own energy, and can only appertain to the animal memory.

It is very singular, that in dreams we never imagine we *hear*, but only *see*. It is still more remarkable that the images which we see are perfectly like their originals. It seems as if the soul of a painter only could draw such true and regular pictures : nevertheless, these designs, however exact they may be, are executed in dreams by persons who have no idea of the art. Beautiful landscapes, which we have never attentively observed, present themselves to us in dreams as true and exact as if done by the most eminent artists.

As to the accidental cause of dreams, by which former sensations are renewed without the assistance of any present and real impression, it ought to be observed, that in a state of profound sleep we never dream ; because all our sensations are extinct, all our organs are inaccessible, every thing sleeps, the internal as well as the external senses. But the inward sense which falls first asleep, is the first that wakes, because it is the most lively and active, and may be more easily excited than the outward senses. Sleep is then less perfect, and less sound, and this is properly the time for dreams. Former sensations, especially those on which we have not reflected, revive. The internal sense, which, through the inactivity of the external senses, cannot employ itself on present impressions, is taken up with, and operates on, preceding sensations. It acts in preference on those by which it was most forcibly affected ; and hence it is that the greater part of our dreams are either excessively frightful or extremely pleasant.

There is another circumstance in dreams worthy our observation ; they are the image of the character of the man. From the phantoms which occupy his imagination during the night, we may conclude

 Dreams.

that he is virtuous or vicious. A cruel man continues to be so even in sleep ; and a benevolent man is even then occupied with his mild and benign dispositions. It is, however, true, that an impure or vicious dream may be occasioned by the state of the body, or by external and accidental circumstances : but our conduct, as soon as we awake, will prove whether these dreams may be imputed to us or not : we need only attend to the judgment we then form of them. A good man does not consider his dreams with indifference : for if during his sleep his mind deviates from the rules of justice and purity, he is affected for it when he awakes. It is certain that a soul which goes to rest with a lively sense of the favour of God, scarcely ever fails in its dreams to have ideas and representations of heavenly things. A good conscience often comforts a holy man in his sleep, through the blessed knowledge he has of the Divine favour.

But sleep is not the only time when fantastic and unconnected objects confuse and disorder our imagination ; how many people are there who dream while awake ! Some have an extravagant idea of themselves, because fortune or favour has raised them to places of rank. Others make their happiness to consist in empty fame, and feed on the chimerical hope of immortality. Intoxicated with passion and vain hope, they dream that they are happy ; but this frivolous and deceitful felicity vanishes like a morning dream. Persons of this character have been well described by the prophet : *They resemble, says he, the hungry man who dreams that he eats, but he awakes, and his soul is empty : they are like the thirsty man, who dreams that he drinks, but he awakes, and, behold, he is faint, and his soul hath appetite.* Isa. xxix. 8. Let us never seek our happiness in vain phantoms, or deceitful dreams ! Let us entreat the Lord to grant us that wisdom which will direct us to aspire after solid and permanent good ; after a glory that fadeth not away, which will occasion no tears of remorse, when, at the hour of death, we come to reflect on our past life.

 NOVEMBER XIII.

THE UNIVERSE IS CONNECTED TOGETHER, AND EVERY PART CONCURS TO
THE PRESERVATION AND PERFECTION OF THE WHOLE.

EVERY thing which the beneficent Creator has produced on our globe is admirably connected with another, and contributes to the mutual preservation of the whole. The earth itself, with all its rocks, minerals, and fossils, owes its origin and continuance to the elements. Trees, plants, grass, and mosses : in a word, all vegetables, derive their nourishment from the earth ; whilst the animals in their turn feed on the productions of the vegetable kingdom. Afterward all these return to their first principles. The earth nourishes the plant, the plant the insect, the insect the bird, the bird the wild

beast ; and in its turn the *wild beast* becomes the prey of the *vulture* ; the *vulture* of the *insect* ; the *insect* nourishes the *plant* ; and the *plant* becomes *earth*. Even man, who makes use of these things, often becomes their prey in his turn. Such is the circle in which all here below revolve.

Thus all beings have been created for each other, and nothing for itself alone. *Tigers, lynxes, bears, ermines, foxes*, and other animals, provide us with furs for our covering. *Hounds* traverse the forests, and pursue the *hare* and the *stag* to furnish our tables, and the part which they receive of the prey is very little. The *ferret* drives the *rabbit* from the deepest recesses into our hands. The *horse*, the *elephant*, and the *camel*, are trained to carry burthens, and the *ox* to draw the plough. The *cow* gives us her milk, the *sheep* its wool ; the *reindeer* makes the sledge fly over the snow and ice : the *swine*, the *hedgehog*, and the *mole*, dig up the earth, that the seeds of plants, being dispersed abroad, may take root the more easily. Even the *hawk* preys for our table, and the *hen* gives us her eggs. The *cock* awakes us to our work, and the *lark* amuses us with her songs throughout the day. The warbling of the *blackbird* is heard from morning till evening ; and the melodious accent of the *nightingale* charms us during the night. The superb plumage of the *peacock* delights our eyes. *Fish* come from the depths of the ocean, throng our coasts, and swim in our rivers, to furnish men, birds, and beasts, with abundance of nourishment. The *silkworm* spins that we may clothe ourselves with its precious web : *bees*, with indefatigable diligence, collect the honey which we find so delicious. The *sea* casts multitudes of *crabs, oysters*, and all sorts of shell-fish, on our coasts, for the supply of men and other animals. The *lanthorn-bearer*, or great fly of *Surinam*, shines through the darkness to enlighten the inhabitants of those countries.

If we examine the different occupations and labours of men, we shall find that they also tend to the same end which nature has proposed. The *mariner* tempts the dangers of the sea, and braves the storm to bring merchandizes which do not belong to him to the place of their destination. The *soldier* sacrifices his blood for his country and the welfare of his fellow-citizens. The *lawyer* is only employed in other people's suits. *Sovereigns* and *magistrates*, who are at the head of government, consecrate their time and talents to the good of the commonwealth. *Parents* lay up treasures for their children. The *husbandman* sows and reaps, yet consumes but little of the produce of his own labour. Thus we live not for ourselves alone ; for the Divine Author of nature has so ordered it, that all beings should become useful to each other. Let us learn from this what our mutual duties are. The strong should succour the weak. The man of understanding should help others with his advice. The learned should instruct the ignorant. In a word, we should love our neighbour as ourselves, and thus fulfil the designs of the Creator. These reciprocal offices, which men owe to each other, have induced them

to form societies. That which divided force could not effect, is easily accomplished by united energy. No person could build a beautiful edifice, nor construct a palace, were he obliged alone to lay the foundation, dig the cellars, mould and burn the brick, raise the walls, put on the roof, make the windows, decorate the apartments, &c. But all these are easily performed by a number of workmen, who mutually assist each other. Such is the invariable law of nature, that in all arts and sciences nothing of importance can be brought to perfection without the concurrence of several persons. How many thousands of men are requisite to make one monarch powerful, an empire happy, or a nation famous and flourishing!

How evident is the wisdom of the Creator in all this! That the inhabitants of our globe, and particularly men, might be happy, he has established such connexions and relations among all beings, that the one cannot subsist without the other. Experience must teach us that God has the welfare of his creatures continually in view. The whole world was planned for this purpose; and all its parts concur to the happiness of mankind. Even the things which appear to be of the least importance, and which we scarcely condescend to look at, contribute their part also to render us happy. The very insects which are so despicable in our eyes, are of great use to us. Thousands of hands are daily employed in our behalf. How many animals lose their lives in order to support ours! And in how many other ways, of which we are ignorant, is nature active in our favour! Kind and indulgent Father, teach us how to appreciate thy goodness and our own happiness! And may we henceforth be inspired with the resolution to employ all our strength in thy service, who hast condescended to do so much for us!

NOVEMBER XIV.

COMMON SALT.

THE seasoning most extensively used, and what the rich and the poor, the king and the beggar, cannot do without, is common salt. Its savour is so pleasing, and it has such excellent properties for digestion, that we may consider it one of the most precious presents which nature has bestowed on man. It is given to us in different ways. The inhabitants of the coasts get it from the sea. They dig pits on the shore which they call *salt-pits*, and plaster them with clay: the sea flows into them when it is rough; the water detained by the pits evaporates by the heat of the sun, and a great quantity of salt remains at the bottom. In other places nature produces salt springs, fountains, pits, and lakes. To extract the salt, the water is evaporated in large pans or caldrons set over the fire. In some other places, salt is found in solid masses in the mountains. The most famous salt mines are those of *Catalonia* and *Poland*. These different kinds of

Common salt.

salt are all alike in their chief properties. Experience teaches us, that salt dissolved in the stomach and intestines has a digestive power, prevents putrefaction, and the too great fermentation of the aliments. Hence it is, that it is used internally to restore and promote digestion, to remove crudities from the stomach, to increase the appetite, and to prevent costiveness. It not only dissolves phlegm and the viscosities which hurt digestion and destroy appetite, but it is also a very excellent stimulant for the stomach; the nerves of which it gently irritates, and assists all its operations. Common salt is, therefore, an excellent digestive, and perhaps the best in the whole economy of nature. Other salts act too powerfully, or are too unpleasant to the taste to be mixed with our food. But common salt acts gently, assists the connexion of all eatables, and prevents that putrefaction to which they are naturally disposed.

Salt is then an especial blessing which we do not sufficiently esteem, because it is common. Let us pay more attention to it, that we may be excited to that gratitude which so precious a gift requires. Were we to attend more to the daily blessings which we receive from the Lord, what causes should we find to acknowledge and celebrate his goodness! Let us sanctify the use of aliments with such reflections. The greater part of our food would be flat and insipid, were we deprived of salt, which greatly increases its flavour and the pleasure we receive from it. But this is the smallest part of its advantages, seeing it is of the utmost consequence to our health, as we have already noticed. What a blessing it will be, should this meditation lead us to prize this gift of God better than we have yet done! Our hearts will become more and more established in gratitude and obedience, when we accustom ourselves to reflect on the blessings which we receive from the hands of our great Benefactor.

In another point of view, salt must be interesting to every observer of the works of nature. The smallest particles of our common salt seem as if they were all exactly cut into eight angles, and six sides, like a *die*: hence it must happen, that most masses of this sort of salt will be of a square or cubic form. Here again the hand of the Most High is visible, which has given salt an invariable form, and has cut all its masses after the same model since the beginning of the world. This figure, always regular, and ever the same, is a proof that it owes not its origin to chance or fortuitous motion, but to the will of an Intelligent Being. This thought is too important, too necessary for our peace, to be disregarded: we should seize every opportunity of recollecting it, and endeavour to have it more and more deeply impressed on our minds.

NOVEMBER XV.

THE ORIGIN OF FOUNTAINS.

ALL great rivers owe their rise to a number of rivulets : rivulets are formed by brooks and streams ; and these owe their origin to springs and fountains. This is incontestable. But whence come the springs ? As water, by its gravity, always occupies the lowest parts of the surface of the earth, whence then can the water come which constantly flows from the most elevated regions ?

In the first place, it is certain that rain, snow, and in general all the vapours which fall from the air, furnish a great part of the water which flows from springs. It is on this account that fountains and rivers are not found in *Arabia Deserta*, and other parts of Africa, where it scarcely ever rains. These waters soak into the earth, and penetrate it till they meet with beds of clay, through which they cannot pass. Here they accumulate and form fountains ; or else they collect in cavities or grottoes, which afterward overflow, or the water leaks out from thousands of crevices, great and small, and endeavours to descend to the lowest places, whither its gravity naturally carries it. Thus the water runs incessantly, and forms subterraneous currents, which uniting with similar ones, form what is termed a vein of water. It is nevertheless very likely, that in certain countries, at least, fountains do not owe their origin to the rains only which fall from the atmosphere ; for we sometimes find considerable springs and lakes on high mountains, which could not, as far as we can judge, be formed by rain or snow alone. There are many springs which, in all seasons, give the same quantity of water ; and sometimes furnish even more in times of great heat and drought, than in moist and rainy seasons. We must, therefore, conclude, that there are other causes both for the origin and maintenance of fountains.

Many springs seem to come from vapours, which being suspended in the atmosphere, are driven by currents of air towards mountains and elevated places ; or, by the power of universal attraction, are drawn towards these great masses. The atmosphere is, more or less, laden with aqueous vapours, which being driven and pressed against the hard cold rocks, condense into drops, and thus swell the springs. Yet still we must grant, that all springs cannot owe their rise to the above causes : for would not the *Danube* and *Rhine*, and other rivers which come from high mountains, be dried up in winter, when these enormous masses are converted into snow and ice ? Therefore, caverns which communicate with the sea and with lakes, must contribute something to the origin of fountains.

The sea-water having gone by subterraneous canals into these great cavities, rises in vapours through a multitude of chinks, and forms drops, which falling down by their own gravity, often find another path ; because water cannot always penetrate where vapours do. Perhaps also the sea-water, especially in countries conti-

 Origin of fountains.

guous to the ocean, is filtered through beds of earth, by which certain springs are produced. These springs have generally a taste similar to the water to which they owe their origin. But the springs which are found on the tops of mountains, cannot owe their rise to this cause ; for the sea-water cannot rise so high : and, supposing it could, the springs would be neither sweet nor potable.

All the causes which we have already mentioned, contribute more or less to the formation of fountains : but there may be other causes which are still unknown. It is true, that nature is ever simple in her operations ; but that simplicity does not consist in employing only one cause for each particular effect : it consists in using the fewest causes possible : which do not prevent the presence of a number of auxiliary causes, which may concur to produce the effect which nature has proposed.

But though this may be otherwise, and though the origin of fountains were yet more dubious and obscure than it really is, we must still acknowledge God as the Creator and Preserver of those salutary springs. “ God speaks, and the fountains spring from the bosom of the mountains : springs become rivulets, and rivulets swell in great rivers, which carry with them abundance and fertility wherever they go. The inhabitants of the country quench their thirst at them, and seek the cool refreshing shade of the woods through which they run. They murmur through the forests, and the wild beasts drink of their waters, and rejoice in them.” It is God, therefore, who causes these beneficent fountains to spring from the high places of the earth : sometimes they glide and wind among the mountains, at other times they precipitate themselves in cataracts from lofty eminences, being increased by atmospheric vapours, or the union of different streams. By this wise arrangement, God maintains, in the kingdom of nature, that continual circulation of brooks, rivulets, and rivers, which contributes to the fertility of the earth, the salubrity of our dwellings, and the draining of waters, whose too great abundance might become injurious.

 NOVEMBER XVI.

HUMAN HAIR.

LET us examine the hair which covers our heads, its wonderful structure, and its various uses, and we shall find that it is not only highly worthy of our attention, but that very sensible traces of the power and wisdom of our Creator are easily discernible in it.

Every complete hair appears, to the naked eye, an oblong slender filament, with a knot or bulb at the root, which is generally thicker, and always more transparent, than the rest. The filament is the body of the hair, and the bulb is its root. The largest hairs have their root, and even a part of the body, enclosed in a small vessel or cap-

Human hair.

sule, formed by a thin membrane. The size of this sheath is in proportion to the size of the root: but the sheath is always a little wider, that the root may not be too much compressed. In such a sheath, the root of the hair is always found. The root has two parts; the one external, the other internal. The outward part is a pellicle composed of little laminæ, the inward is a glutinous fluid in which some fibres are united; this is the marrow of the root. From the outward part of the root, there grows in general five, very rarely six, little white threads, exceedingly fine, transparent, hard, and often twice as long as the root. Besides these filaments, we see other little bulbs rising here and there, but they are viscous, and easily dissolved by heat. The main body of the hair springs from the interior part of the bulb: it is composed of three parts; the exterior sheath, the interior tubes, and the marrow.

When the hair comes to the pore of the skin through which it is to pass, it is strongly enveloped in the pellicle of the root, which then forms a very small tube. The hair pushes the cuticle before it, which serves as a sheath to protect it in the beginning, while it is still soft and tender. The rest of the sheath or covering of the whole hair is of a particular substance; it is transparent, and especially so at the point. In young hair this coat is very soft, but it afterward becomes so hard and elastic, that it shrinks back with some noise when it is cut. This sheath, or coat, preserves the hair a long time. Just under the coat there are many little fibres, which extend along the hair from the root to the point. They are united among themselves, and with the sheath which is their common covering, by several elastic filaments: and this bundle of fibres forms a tube filled with two substances, the one fluid, the other solid, which together constitute the marrow of the hair.

An attentive observer of the works of God, will acknowledge the Divine wisdom in the admirable structure of a hair, as well as in the other parts of the human body. Thus, from the crown of the head to the sole of the foot, there is nothing in man which does not proclaim the perfection of the Creator. Even those parts which seem of least importance, and which might be given up without inconvenience, are nevertheless of great importance, if they be considered in their connexion with the other members of our bodies, or in their wonderful structure and use. This may be asserted particularly in regard to the hair. How many are there who consider it an object worthy of no attention, and who never think they can discover any traces of the wisdom and goodness of God in it? But besides that, in general, there is no part of our body without its particular appointment and use, it is very easy to discern the wise purposes for which the hair has been given us.

And first, it is evident, that it contributes much to the beauty and ornament of the face. But this is probably its least use. The hair manifestly defends the head, and preserves it from cold and damp; and keeps the brain in its natural state of warmth. It certainly pro-

Human hair.

motes a gentle and insensible evacuation of some humours from the body, helps perspiration, and discharges from the head and other parts those superfluous humours, which would otherwise accumulate there. The hair may answer several other purposes, which are as yet unknown to us. But it is sufficient to know some of the purposes which God has designed to accomplish by it. A proper consideration of these must excite us to acknowledge and adore the power, wisdom, and goodness, of our great Creator.

NOVEMBER XVII.

THE SYSTEM OF THE WORLD.

HITHERTO we have been considering the earth, which is but a point in comparison of the system of the universe. Let us now raise our thoughts to innumerable worlds, at the sight of which this point which we, and millions of other creatures inhabit, will be eclipsed, and appear as nothing. Let us examine, meditate, and adore.

The sun, which gives life to all, is nearly in the centre of the system; and, without changing his place, turns round his own axis, from west to east, in about 26 days. Round the sun, in oblong or elliptic circles, all the planets move, from *Mercury* to the *Georgium Sidus*, or planet *Herschel*.

Mercury, who is the nearest to the sun of all the planets, performs his revolution in 87 days, 23 hours, and 25 minutes; but by reason of his nearness to the sun, he is generally buried in his rays, and therefore, seldom visible.

Venus describes a greater ellipsis: and finishes her revolution in 224 days, 16 hours, and 49 minutes.

The *earth* performs her revolution in 365 days, 5 hours, and 49 minutes, what we commonly term a *year*: and the *moon* finishes her's in the same space of time.

Mars finishes his course in 686 days, 23 hours, and 30 minutes.

Jupiter and his four moons, in about 4332 days, and 8 hours; nearly about *twelve* of our years.

Saturn, and his seven moons or satellites, employs 10,761 days, and 14 hours, in running his immense circuit; a space of time answering nearly to *thirty* of our years.

Last of all comes the planet *Herschel*, or *Georgium Sidus*, with his six moons; which, as far as our discoveries have reached, is the most distant in the solar system: he performs his revolution in 30,445 days, upwards of *four score* of our years.

But is even this immense circuit the boundary of the universe? No, certainly: far beyond the orbit of *Herschel* is the region of the fixed stars, the nearest of which is at least 400,000 times further from the earth, than the earth is from the sun; although his mean

distance from us is not less than 95 millions of miles, or 23,799 semi-diameters of the earth! And how many globes may there be in the vast space which separates *Herschel* from the fixed stars, which we cannot discover?

But is it possible that the sun, which appears to traverse the half of the sky in twelve hours, should nevertheless be a fixed point in the centre of the universe? Do we not see it in the morning in the east, and in the evening in the west? And can the earth move continually about the sun, without our perceiving it?

This objection, founded on the illusion of our senses, is really of no weight. Do we perceive the motion of the boat, when we are gliding down a river? And when we are in a boat, or in a carriage, does not every surrounding object seem to move and pass in a contrary direction to that in which we are going, though they are all fixed and immovable? However our senses may deceive us in this respect, our reason is obliged to acknowledge the truth and wisdom of that system, which supposes the revolution of the earth. Nature acts always by the shortest, easiest, and most simple ways. By the motion of the earth round the sun, we can account for the different appearances of the planets, their periodical rotations, their being stationary, and their direct and retrograde motions. And is it not much more natural and easy that the earth should turn round its own axis in twenty-four hours, than that the sun, the planets, and the whole starry heavens, should be carried round the earth in that space of time? An incontestable proof that the sun is in the centre of the system, and not the earth, is, that the motions and distances of the planets have respect to the sun, and not to the earth. And were we to suppose the contrary, what would become of the harmony and perfect conformity which prevail in all the works of the Creator? But according to our hypothesis, every planet has the same kind of motion which we attribute to the earth.

These reflections on the system of the universe, are exceedingly proper to fill our minds with the most sublime ideas of our adorable Creator, and to give us a lively sense of our own littleness. With what pleasure does our mind pass from one idea to another, till it is lost in the contemplation of these sublime objects! With what emotions of astonishment and veneration do we perceive the grandeur of our God! It is true, that an exact and perfect knowledge of the system of the world cannot be attained by our limited understanding; but we know enough of it to be convinced, that the whole is arranged with infinite wisdom and goodness; and that no system can be imagined more beautiful, more worthy of the Infinite Being, or more advantageous to the inhabitants of the different globes.

Lobsters.

NOVEMBER XVIII.

LOBSTERS.

THOUGH lobsters were of no use to us as food, they would nevertheless be worthy our attention. The females of these crustaceous animals have, a few weeks ago, undergone a great change. They have cast off their old coverings, and clothed themselves with new shells. This may be termed their *moulting*. In thus changing their covering they increase in size, and this mode of growth is common to all crustaceous insects: they increase in size as often as they cast off their old coverings; and this operation is very painful. At the time they change their shell, they change their stomach and intestines also: indeed, they seem to feed upon their former stomach, which wastes by degrees, so that the animal appears to nourish itself with those parts of its body which served it before for digestion. The little white round stones, improperly called *crabs'-eyes*, begin to be formed when the stomach is destroyed, and are afterward enclosed in the new one, where they gradually diminish, till at last they wholly disappear. There is reason to believe that the animal uses them as a remedy for the disorders of its stomach: or, probably, they are the receptacle for the matter which is employed in the formation of the new shell.

Except at the time of casting their shells, these animals keep at the bottom of the water, a little distance from the shore. In winter, they prefer deep water; but they come to the shore in summer, if the want of food does not oblige them to go deeper into the sea. That they may easily seize their prey, nature has given them several arms and legs. Some of their claws are often as large as their head and body together. What is most remarkable is, that they have the faculty of reproducing their claws and horns, when they have been bruised or broken. They can even rid themselves of them when they are inconvenient. They perform this operation in any posture; but they effect it more easily when turned on their back, and the shell is broken with strong iron pincers, and the flesh bruised at the third or fourth joint of the claw. Immediately after the wound the animal is convulsed; the pain causes it to shake its limbs every way; and shortly the wounded limb falls off from the body, and a gelatinous humour oozes out and stanches the blood: when this is taken away, the animal bleeds to death. This substance envelopes what may be termed the bud of the new limb; which appears at first only as an excrescence, or small cone. By degrees this cone lengthens, assumes the form of a limb, which becomes as complete as the old one.

The manner in which these animals multiply is not less extraordinary. The male carries the prolific substance in an extremely long thread. What principally distinguishes it is a double hook under the tail, which is not found in the female. These animals grow pregnant about autumn: if a female be at that time opened, red clots

 Lobsters.

may be perceived, which are the evidences of impregnation. They gradually disappear; and under the tail, where the female has many little fibres, a multitude of little round eggs may be seen, exactly resembling those in the *roe* of a herring. The first eggs appear in December, and are more than a hundred. They grow large in proportion to the increasing warmth; and before St. John's day, we find little living lobsters among the eggs, about the size of an ant, which continue attached to the fibres under the mother's tail, and are there fostered till all the eggs are hatched. At length they disengage themselves from these fibres, and then cling to those of trees or plants near the shore, and there continue till they are strong enough to commit themselves to the deep.

The *lobster* is certainly one of the most extraordinary creatures in the world. An animal whose skin is stone, which it casts off every year to cover itself with new armour. An animal whose flesh is in its tail and feet: whose hair is within its breast: whose stomach is in its head, and which is changed every year for a new one; the very first office of which is, to digest the old one! An animal which carries its eggs within its body before they are impregnated, but as soon as this takes place, carries them without under its tail; and which multiplies its kind with a double organ of generation! An animal with two stones in its stomach, which are engendered and grow there, and with which it feeds itself till they are consumed! An animal which can cast off its limbs at pleasure, when they are troublesome, and replace them with others! And, lastly, an animal whose eyes are placed on long moveable horns! So singular a creature will long remain a mystery to the human mind. It furnishes us, however, with new motives to acknowledge and adore the power and wisdom of the Creator.

 NOVEMBER XIX.

 THE CONVENIENT AND ADVANTAGEOUS SITUATION OF ALL THE PARTS
OF THE HUMAN BODY.

IF we examine our bodies with due attention, we cannot but observe, that all the parts of which it is composed, are so situated as to be most convenient, and best adapted to their various uses. It belonged to the Creator to arrange them as he thought proper: and his wisdom has assigned to each member its proper place; and in forming our bodies, he has taken care not only to provide for their wants and conveniencies, but also for their beauty and ornament.

In the first place, with regard to our *wants*; it is manifest, that all the parts of our body are situated in the most advantageous manner. Our body is a machine, which is to move itself by the powers given it, without receiving any impulse from any exterior force. It is necessary it should speedily, and with facility, perform the will of

 Wise arrangement of the different parts of the human body.

the mind. All the bones are joined together : but that we might make use of our limbs without difficulty, stretch out or bend the arm, stoop or erect ourselves as we please, the bones are divided into many articulations, and each is rounded at the end, and inserted in the spheric cavity of another, where it moves with ease, because it is covered with a smooth, polished cartilage, and moistened with an unctuous humour, which smears the cartilages, and prevents the bad effects of friction. What is most remarkable in this is, that these bones are so firmly set in, that they do not slip out, nor separate from each other, although the feet be obliged to carry so great a burden, and the hands to lift sometimes more than one hundred pounds weight !

In the arrangement and disposition of the different parts of our body, God has provided also for our *convenience*. The volitions and determinations of the soul may be executed without obstacle or difficulty by the organs of the body. By means of the senses it is speedily informed of whatever concerns it ; and the different members of the body directly obey its orders. The *eye*, which must watch over the whole body, is situated in the most elevated part ; it can turn itself easily on all sides, and observe whatever passes. The *ears* are also situated in the highest place, at each side of the head ; and stand open, day and night, to inform the soul of the least noise, and to communicate to it all the impressions of sound. As the food must pass through the mouth to the stomach, the organ of *smelling* is placed immediately above it, to watch, like the eye, that nothing corrupted or improper may be received by it. As to the sense of *feeling*, it has not its residence in any particular place, but is dispersed over all parts of the body, that all may hereby distinguish pleasure from pain, and things injurious from things profitable. The *arms*, which are the servants which the soul employs to execute the greater part of its desires, are placed near the breast, where the body has most strength ; and without being at too great a distance from the lower parts, are situated in the most convenient manner for all sorts of work and exercise : and for the defence of the head and the other members.

Finally, the Creator, in the formation of our body, has designed also to attend to its *beauty*. This consists in the visible harmony and exact proportion of the members ; and in the pleasing mixture of the colours of a fine and delicately formed skin. Thus we see that these parts of our bodies, which are *double*, as the eyes, ears, arms, legs, &c. are placed one on each side, at an equal height, the right exactly answering the left ; whereas those which are single, as the forehead, nose, the mouth, and the chin, are placed in the middle. This proportion appears in the great as well as in the small. The length of the sole of the foot, is the *sixth* part of the height of the whole body, as the length of the face is the *tenth*, and the cubit the *fourth* part. In children the head is larger than it should be, in proportion to the rest : the reason is, that the head being the principal

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part of the body, and the seat of the senses, it should come sooner to perfection than the other parts : and the more so, as being entirely composed of bones, it could not extend so much as the fleshy members, which it must otherwise have done : for we observe, that in infancy all the members grow at once ; and that they extend according to the most exact proportions in length, in breadth, and in thickness ; and thus are in continual harmony with the size of the whole body.

Admire, O man, the perfection and beauty of thy body, the connexion and admirable harmony of all its parts. Each member is connected with others, yet they never embarrass nor impede one another in the performance of their different functions. They are situated in the most convenient places, that they may the more readily accomplish their offices, and lend each other mutual assistance. All the organs are so many springs in this admirable machine. They correspond to each other ; and act in concert to fulfil the different purposes for which they were designed. Take heed not to destroy this curiously contrived machine ; nor to deform it by irregularity and excess. Do not dishonour it by base and shameful passions. Act so, that thy body may be always a monument of the wisdom and goodness of God. But especially take heed, that thy soul, which has been degraded by sin, be re-established in its primitive beauty and holiness, by the mercy of thy Redeemer. It is by this alone that thou canst be compensated for the change thy body must undergo, when it shall return to the dust out of which it has been formed.

 NOVEMBER XX.

ORDER AND REGULARITY OF NATURE.

IN contemplating the world, we discover every where traces of a Supreme Intelligence, who ordained every thing, who has foreseen the effects which should result from the energy he has impressed on nature ; and who has counted, weighed, and measured all, according to his own designs, with infinite and unerring wisdom.

Thus the universe once formed, may always continue, and constantly fulfil its destination, without the necessity of changing any thing in the primitive laws once established. The contrary is often the case with the works of men. The most skilfully constructed machines soon cease to answer the intended purpose : they require continual repairs, and are soon worn out and unfit for use. The *principal* of these arrangements and irregularities is found in their primitive construction : for there is no artist, how eminent soever he may be, who can foresee all the changes which his work may undergo, or be able to provide against them.

The corporeal world is also a machine, but its component parts, and their uses, are innumerable. It is divided into many luminous

Order and regularity of nature.

and opaque globes, which serve for habitations to an infinite multitude of living creatures of all kinds. The opaque globes revolve round the luminous ones in their prescribed orbits, and limited times : and receive from them light and heat, day and night, seasons, and different degrees of temperature, nourishment, and growth, according to the nature and necessities of their different inhabitants. The position of the planets, and their mutual gravitation, are so diversified, that it seems almost impossible to determine beforehand, the times in which they will return to the point whence they departed, and begin anew their periodical course. And notwithstanding the variety of phenomena which these globes present to us, and the astonishing multiplicity of their motions, it has never happened, in the course of a thousand years, that these enormous masses have ever struck against, or interrupted each other, in their revolutions. All the planets perform their revolutions in the times prescribed to them. They have always preserved their order and their respective distances, and have never got nearer to the sun. Their respective forces are still exactly balanced, and stand in the same relations to each other. The fixed stars are the same to-day that they were a thousand years ago. The distances, projectile forces, right ascensions, declinations, parallaxes, and direction of all the heavenly bodies, are still the same. The sun also is still at the same height : the days and nights, the years and seasons, are just now what they were formerly. An incontestable proof, that in the first arrangement of the heavenly bodies, in the proportion, laws, and relations of their respective forces, and in the rapidity of their course, the wise Author of nature has foreseen and determined the future state of the world, and all its component parts, to the utmost duration of time.

The same may be said of our earth, which is annually subject to different revolutions and changes of temperature. For although it seems, at first sight, as if fine weather, cold, heat, dew, rain, snow, hail, lightning, tempests, and all sorts of winds, varied indifferently, and were dispensed by chance : that it is by mere accident the water overflows the land in any particular place, altering its surface by changing solid ground into lakes and marshes ; that in other places we see continents where seas were formerly ; that mountains are formed while others moulder away ; and that rivers are either dried up or turned out of their former beds ; nevertheless, it is certain, that each modification of our earth has its sufficient cause in the preceding modification : this, in that which preceded it, and the whole in that which was established at the creation of the world. But, nothing is better calculated to make us sensible of our ignorance of particular natural events, and their connexion with the future, than that variety which we observe in the temperature of the air ; a variety which has so much influence on the appearance and fertility of our globe. In vain we multiply meteorological observations ; for it is impossible to deduce from them fixed rules and consequences for the future ; for we never yet have seen one year perfectly similar

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to another. Yet we are well convinced, that these continual variations, and that apparent confusion of elements, do not essentially change our globe, alter its figure, destroy its equilibrium, nor render it uninhabitable ; but, that they are, on the contrary, the true means of preserving annual order, fertility and abundance. Since, therefore, every present modification is founded on a preceding one, it is manifest, that the elements have not been formed and combined by blind chance ; but that from the beginning an Eternal Wisdom has produced, combined, and measured the elements ; appreciated their powers, and determined their effects, till the conclusion of time.

Thus, the whole is not composed of disunited or ill-connected materials, or of parts which have neither relation to, nor connexion with, each other : it is a regular and perfect whole ; the structure and arrangement of which is the work of a Supreme Intelligence. If we behold in the world a multitude of beings which have the same nature and destination that we have, and are united by a multitude of relations : if we discover genera and species, more numerous still, of other creatures, which are also, more or less, mutually connected ; if we allow, that by the mixture and action of elements, all these animated beings are supported, and receive all that their nature requires : if, afterward, we carry our thoughts further, and consider the relations there are between our earth and the heavenly bodies, and the constant regularity of their motions, the conformity, concord, and admirable harmony, which are found among all these globes that are placed within our notice, we shall be more and more filled with astonishment at the sight of the magnificence, order, and beauty, of nature ; and more deeply convinced of the infinite wisdom of the Creator. But all that we know, at present, of the order and harmony of the corporeal world, is but a small ray of that eternal light which we hope for ; and in the enjoyment of which that Divine Wisdom, which is now in so many respects impenetrable to us, shall be manifested to us with infinite splendour.

 NOVEMBER XXI.

OF WINTER IN THE NORTHERN COUNTRIES.

THE time is now approaching which excites the discontent of so many people. The severe season of winter appears to them to contradict the plan of the Ruler of the universe, which in all other respects is so wise and beneficent. The rich complain that nature is become gloomy and dismal ; and the poor, whose poverty and wants increase in this season, groan and murmur. Yet let those ungrateful people magnify as they please the inconveniencies and distresses of winter, they shall be obliged to acknowledge, when they compare their lot with that of other countries, how great God's goodness is towards them in this respect. For, in a great part of the northern

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countries, there is neither spring nor autumn ; and the heat is as insufferable in summer, as the cold is in the winter ; the violence of the latter is such, that *spirits of wine* freezes in the thermometer. When the door of a warmed chamber is opened, the external air which enters, converts all the vapours within into snow ; so that the place is filled with thick white vapours. If a person go out of the house he is almost suffocated, and the air seems to tear the lungs. All appears in a state of death, no person daring to quit his apartments. Sometimes the cold becomes so intense, and that suddenly, that if a person cannot make a timely escape, he is in danger of losing an arm, a leg, or even life itself. The fall of the snow is still more dangerous : the wind drives it with so much violence, that a person cannot possibly find his path : trees and bushes are covered with it, people's eyes blinded, and, at every step, the traveller is in danger of falling into a new precipice. In summer the day lasts for three months ; and, during the same space, a perpetual night reigns in winter.

What would they say, who complain of the cold in our climates, were they obliged to live in the countries above described ? It is plain, that we do not know our own advantages : a very little reflection would suffice to show us how contented we should be with our lot. However gloomy or severe our winter days may be, they are quite supportable by people in general ; and if there be some who cannot bear them, it is chiefly owing to their effeminacy and self-indulgence.

But why has the Creator appointed so many thousands of people to dwell in regions where nature fills them with terror for a great part of the year ? Why has he not made these people as comfortable as we are ? Foolish questions ! We are mistaken, if we suppose that the inhabitants of the north pole are unhappy through the length and severity of their winter. Though poor, yet being exempt through their simplicity from all desires not easy to be satisfied, these people live contented among the icy rocks by which they are encompassed, without knowing the blessings which the inhabitants of southern climes consider as an essential part of their felicity. If the barrenness of their soil prevent their fields from bringing forth such a variety of fruits, plants, &c. as ours produce, the sea is so much the more bountiful in its gifts to them. Their mode of life inures them to cold, and enables them to defy the tempests : and, as to particular resources, without which they could not support the rigour of the climate, nature provides them in abundance. Their deserts are stocked with wild beasts, the fur of which protects them against the cold. Their reindeer supplies them with food, drink, garments, beds, and tents : this supplies most of their wants ; and the animal that thus provides for them is supported with very little expense. When the sun does not rise with them, and they are surrounded with darkness, nature herself lights a torch for them, and the *aurora borealis* illuminates their nights. Possibly these people consider

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their own country as the most extensive and happiest in the world, and pity our lot as much as we commiserate theirs.

Thus each climate has its advantages and inconveniencies, which are generally so well balanced, that it is difficult to say, upon the whole, which deserves the preference. Considered in this point of view, there is no country on the earth, whether the sun dart his rays on it in a perpendicular or oblique direction, or whether covered with eternal snow or otherwise, that can be said to enjoy more advantages than any other. In one place the conveniencies of life are more numerous ; in another, that *variety* of blessings is absolutely wanting ; but those who have not this variety are subject to fewer temptations, carking cares, or bitter remorse ; in a word, they are ignorant of a multitude of obstacles to happiness, and this doubtless compensates for the want of a number of pleasures. We know with certainty, that Providence has dealt out to each country what was necessary for the support and comfort of its inhabitants. Every thing is adapted to the nature of the climate, and God provides, by the wisest means, for the wants of his creatures.

NOVEMBER XXII.

TRANSFORMATIONS IN NATURE.

THE transformations which take place in nature, are numerous ; or rather, every thing is metamorphosed in the natural world. The form of objects varies continually ; certain bodies pass successively through the animal, vegetable, and mineral kingdom : and there are some compound substances which gradually become minerals, plants, insects, reptiles, fish, birds, beasts, and men. Millions of bodies are annually turned into dust. Where are the flowers which, during the spring and summer, adorned our fields, gardens, and meadows ? One species appears, withers, and gives place to another. The flowers of March, and the modest violet, after having announced the approaching spring, have disappeared, that we might have room to admire the tulip and the rose. In their places others spring up, till all the flowers have fulfilled their design. It is exactly the same with respect to men. One generation comes and another goes. Thousands of human bodies return annually to that dust from which they were taken : but, from the redissolved bodies, new and more beautiful ones are formed. The salts and oils of which they were composed, dissolve in the earth : the more subtile parts are elevated in the atmosphere by the heat of the sun ; are there mingled with other matters, and being variously dispersed by the winds, fall down in dew and rain, sometimes on one place, and sometimes on another : as to the more gross parts, they unite with the earth. The grass which is nourished by this, grows into long spires : thus, the flesh of man becomes grass and feeds the flocks, whose wholesome milk and flesh are afterward converted into our own substance.

Transformations in nature.

These continual transformations which take place in nature are a sufficient proof that the Creator has determined that nothing shall be lost, and that nothing is useless. The dust on flowers, which is employed in the fecundation of plants, is but a very small portion of what each flower contains : but, what appears superfluous, is not lost ; the wisdom of God has formed the bees, who make use of it for their honey. The earth gives us daily new gifts : and it would be finally exhausted if what it gives were not by some means rendered back again. All organized bodies become decomposed, and are at last converted into earth. During this dissolution, the volatile parts are raised into the atmosphere, and dispersed every where. Thus the remains of animals are scattered through the air, as well as through the earth and water : and perhaps the parts which rise into the atmosphere, are by far the least numerous. All those particles, dispersed hither and thither, speedily reunite in new organic bodies, which, in their turn, shall undergo the same transmutations. And this circulation, these continual metamorphoses, which began when the world was created, shall terminate only when it is destroyed.

But the most remarkable transformation, or at least that in which we are most interested, is what concerns ourselves. We know that our bodies have not been originally, and will not hereafter be, composed of the same number of particles as at present. The body which we had in our mother's womb, was extremely little : it was larger when we came into the world : and since that time, it has increased to fifteen or twenty times that size : consequently, blood, flesh, and other foreign substances, drawn from the animal and vegetable kingdoms, which did not belong to our bodies, have been since assimilated to them, and became a part of themselves. The need we have of daily food proves that there is a continual waste of the particles of which our bodies are composed, and that this waste must be repaired by aliments. Many particles evaporate imperceptibly : for it appears, by very correct experiments made by an eminent physician on himself, that of *eight* pounds of food, which are necessary for the support of a healthy man, only one *fiftieth* part is converted into his substance, and all the rest is disposed of by perspiration, and other excretions. From this it may be inferred, that in *ten* years few of the particles of which we are now composed will remain. And, finally, when our bodies shall have gone through several changes, they shall be transformed into dust, till, at the day of the resurrection, they undergo that blessed and last revolution, which shall place them in an unalterable and eternal state.

How should we rejoice at this future state, where we shall be free from all the changes which we experience here below ? Let us look with serenity on the daily revolutions to which all earthly things are subject, and which are necessary in the present state. By acting thus, we shall draw nearer to perfection. May we not rejoice in hope of this grand revolution ! When the earth shall have under-

gone its last and great change, may we be introduced into the new heavens and the new earth, where even the shadow of change shall never exist!

NOVEMBER XXIII.

THE GREATNESS OF GOD DISCERNIBLE IN LITTLE THINGS.

HE who delights to contemplate the works of God, will not only discover his hand in those immense globes which compose the system of the universe, but also in the little worlds of insects, plants, and metals. He will search for, and adore the wisdom of God, as well in the spider's web, as in that power of gravitation which attracts the earth towards the sun. These researches are at present the easier, as microscopes have discovered to us new scenes and new worlds, in which we behold, in miniature, whatever may excite our admiration. They who have not the opportunity of using these machines, will read, at least with pleasure, the following remarks on microscopic objects.

Let us, in the first place, observe the inanimate world. Behold those mosses and little plants, which God has produced in such great abundance. Of what extremely small particles and fine threads are these plants composed! What a variety in their forms and shapes! Who can enumerate all their *genera*, and all their *species*! Think on the innumerable multitude of small particles of which every body is composed, and which may be detached from it. If a hexagon of an inch square, contain a hundred millions of visible parts, who can calculate all the particles which compose a mountain! If millions of globules of water may be suspended from the point of a needle, how many must there be in a spring, in a well, in a river, in the sea! If from a lighted candle there issue in a *second*, more particles of light than there are grains of sand on the whole earth, how many igneous particles must there issue from a large fire in an hour! If one grain of sand contain more than a thousand millions of particles of earth, how many must there be in the human body! If men can divide one grain of copper into millions of parts, without arriving at the first elements of matter; if odoriferous bodies can exhale a sufficiency of odorous particles, so as to be perceived at a great distance, without any sensible diminution of weight in those bodies, it would require an eternity for the human mind to calculate the number of these particles!

If we pass next to the animal kingdom, the scene will be infinitely extended. In summer the air swarms with living creatures; each drop of water is a little world full of inhabitants; every leaf is a colony of insects; and every grain of sand is the habitation of a multitude of animated beings. Every plant, seed, and flower, nourishes millions of creatures. Every person has seen those innu-

merable swarms of flies, gnats, and other insects, which gather together in a small space : what prodigious hosts must there be of them that live, sport, and multiply their kind over the face of the whole earth, and in the immense extent of the atmosphere ! How many millions of still smaller insects and worms are there which crawl on the earth, or in the entrails of animals, the number of which is only known to God ! With what splendour does the power of God manifest itself to the mind, when we reflect on the multitude of parts of which these creatures are composed, of whose very existence most men are ignorant. Were we not convinced of it by daily experience, could we imagine there were animals a million of times less than a grain of sand, with organs of nutrition, motion, generation, &c. ? There are shell-fish so small, that even viewed through the microscope, they appear scarcely so large as a grain of barley ; and yet they are real animals, with durable dwelling-places, the foldings and recesses of which form so many different apartments ! How exceedingly small is a *mite* ; Nevertheless, this almost imperceptible point seen through a microscope, is a hairy animal, perfect in all its members, of a regular figure, full of life and sensibility, and provided with every necessary organ ! Although this animal is scarcely visible to us, yet it has a multitude of still smaller parts : and what is yet more admirable is, that the glasses which show us so many faults and imperfections in the most finished works of men, can discern nothing but regularity and perfection in these microscopic objects. How inconceivably fine and slender are the threads of a spider ! it has been calculated, that it would take 36,000 of them to make the thickness of a thread of common sewing silk ! Each of the six papillæ, from which the spider draws that glutinous liquor of which it forms its web, is composed of a thousand insensible pores, which give passage to so many threads ; so that however fine the spider's thread may appear, it is composed of 6000 smaller ones.

You are struck with astonishment. But suppose we had microscopes which would magnify some thousands of times more than those glasses do, through which a mite appears no larger than a grain of barley, what wonders should we then see ! And even then, should we reach the limits of the creation in these inconceivably small productions ? Certainly not : and it would be presumption and extravagance to believe it. Each creature has a kind of infinity ; and the more we contemplate the works of God, the more the wonders of his power will be multiplied in our sight.

Our imagination is confounded in the two extremes of nature, the *great* and the *small* : and we know not whether we should admire the Divine power more in those enormous masses, those immense globes which roll above our heads, or in those microscopic animals which are invisible to the naked eye. Should not the contemplation of the works of God be our most pleasing occupation ? The trouble of study would be amply compensated by the pure and innocent pleasures which it would afford. It would, at least, awaken in us an

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ardent desire to arrive in those blessed regions, where we should require neither microscopes nor telescopes to enable us to discover the wondrous works of God. There, all his works shall be so unveiled to our eyes, that we shall be able to distinguish the destination, structure, and relations, of each object. There, immortal songs of praise shall resound to the honour of the Creator of the universe. There, all distinction of great and small shall be entirely done away, for every thing shall appear great in our sight, and fill our souls with admiration and joy!

NOVEMBER XXIV.

GRADUAL INCREASE OF THE COLD.

WE daily perceive that the cold gradually increases. In the last month we lost part of the warmth of autumn: but the cold was then very moderate; for the earth was still in a measure warmed by the rays of the sun. The present month is still colder, and the shorter the days grow, the more the earth loses its warmth; and the cold consequently increases. We cannot doubt this: daily experience proves it. But do we sufficiently consider the wisdom and goodness of the Creator, which are manifest in this arrangement? It certainly requires but a small degree of attention to discover this wisdom and goodness in the insensible progress of the cold.

In the first place, this gradual increase is indispensably necessary, to prevent a derangement in, if not a total destruction of, our bodies. If the cold, which we feel in the winter months, were to come suddenly in the beginning of autumn, we should be instantly benumbed, and this change would speedily become mortal. How readily do we catch cold in the cool summer evenings? And how would it be, were we to pass suddenly from the burning heats of summer to the freezing cold of winter? With how much goodness has the Creator provided for our health and life, in granting us such a temperature in the months which immediately follow the summer, as sufficiently prepares our bodies to endure the increase of the cold without injury!

What would become of the animals whose delicate constitution could not endure the cold, if the winter came on suddenly, and without being previously announced? Two-thirds of fowls and insects would perish irrecoverably in a single night; and their eggs and young with them. But as the cold augments by degrees, they have time to make the necessary preparations for their preservation. The autumnal months, which separate the summer from the winter, warn them to leave their present dwellings to go into warmer climates, or seek places where they may quietly and securely rest during the severe seasons.

 Gradual increase of the cold.

It would not be less fatal to our fields and gardens, were the earth to be suddenly deprived of the heat of summer : all the plants, and particularly the exotics, would instantly perish ; and the spring could produce no flowers, and the summer no fruits.

It is therefore just, that in this arrangement we should acknowledge and adore the wisdom and goodness of God. Let us not consider it as a matter of little importance that the heat diminishes insensibly, and the cold gradually increases, from the end of summer to the beginning of winter. These insensible revolutions were necessary, that we, and millions of other creatures, might be able to subsist ; and that the earth might be able to bring forth fruit. If the presumptuous man, who so often dares to find fault with the laws of nature, could displace one single wheel in the great machine, he would soon find, to his cost, that instead of mending he had marred the whole. Let us understand, that nothing is suddenly produced : and that no change takes place till it is sufficiently matured. All natural events succeed each other gradually, all proceed in the most regular order, and happen precisely at the specified time. ORDER is the great law which God follows in the government of the world ; and hence it is, that all his works are beautiful, regular, and perfect.

Let it be our constant occupation to study the beauty and perfection of God's works, and we shall acknowledge the traces of the divine wisdom and goodness in every season of the year. Then all those foolish complaints shall cease, by which we have so often insulted our Creator ; we shall find order, wisdom, and goodness, even in those things, where we thought we could discover nothing but disorder and imperfection ; and we shall exclaim at last, with the deepest conviction—All the ways of the Lord are goodness and truth ; his conduct towards us is mercy and kindness ; but this is evident only to those who love his covenant, and keep his precepts.

 NOVEMBER XXV.

REFLECTIONS ON SNOW.

DURING winter, the dullest season of the year, the earth is often covered with snow. Every person sees it fall, but few take the trouble to examine its nature, or inquire into its use.

This is the general lot of those objects which we have commonly before our eyes, and from which we derive various advantages. Often, the things which deserve our attention most, are those which we generally neglect. Let us be wiser in future ; and begin by reflecting a few moments on snow.

It is formed of very light vapours, which being congealed in the atmosphere, fall down afterward in flakes of different dimensions. In our climates these flakes are often very large ; but we are assu-

Reflections on snow.

red, that in Lapland the snow is very small, and resembles fine dry dust. This is, doubtless, occasioned by the great cold of that country. It is observed, that among us the flakes are large in proportion to the degree of cold; and that they become very small when it freezes intensely. The little flakes generally resemble hexagonal stars; but some have *eight* angles, others *ten*, and some are altogether irregular. The best way of examining them is to receive them on white paper: but hitherto little has been said satisfactory on the cause of these different forms. The *whiteness* of this meteor may be easily accounted for. Snow is extremely thin and light; consequently, it has a great multitude of pores which are filled with air: it is, besides, composed of parts more or less close and compact: such a substance does not permit the rays of the sun to pass through, nor does it absorb them; on the contrary, it reflects them with considerable force, and this is what makes it to appear white to us.

Snow, as it falls, is twenty-four times lighter than water. This is proved by melting twenty-four measures of snow; for they produce but one of water. For snow is not frozen water, but only frozen vapour. Snow evaporates considerably; and the greatest cold does not impede this evaporation. It has been doubted whether it snows at sea; but those who have performed voyages in the winter, on the northern seas, have assured us that they have there met with much snow. It is well known, that the tops of high mountains are generally covered with snow: if a part of it melts, it is speedily replaced by new flakes. As the air is much warmer on the plains than it is on the mountain-tops, it may rain on the former, while it snows heavily on the latter.

Snow has a variety of uses. As the cold of winter is more injurious to the vegetable kingdom than it is to the animal, plants must perish were they not protected by some covering. God has so ordered it, that the rain, which in the summer fell to cool and nourish the plants, should fall in winter under the form of soft wool: which covers the vegetables, and protects them from the rigours of the frost, and the chilling blasts of wind. Snow has a certain degree of warmth; but so temperate as not to stifle the grain. And, as it contains, like all other vapours, different salts, which it drops when thawed, it contributes much to the fertilization of the earth. When, therefore, the snow melts, it becomes a fruitful moisture to the earth; and, at the same time, washes away from winter seeds and plants whatever might prevent or injure their growth. What remains of this snow-water, helps to supply springs and rivers, which were diminished during the winter.

These reflections may be sufficient to convince us of the goodness of God, which is manifest in the meteor of which we have spoken. We see plainly that winter has its advantages, and that it is not such a gloomy season as many imagine. Let us raise our hearts in gratitude and joy to that beneficent God, who even from snow and clouds.

pours down blessings and abundance upon the earth. Our complaints and murmurs are insulting to the Divine government ; and they are the more criminal, because we may in every occurrence behold the footsteps of the wisdom and goodness of God.

NOVEMBER XXVI.

SLEEP OF ANIMALS DURING WINTER.

NATURE seems dead at present, because it is deprived of so many creatures which, in summer, rendered it so beautiful and lively. Most of the animals which have disappeared, are buried during the winter in a profound sleep. This happens not only to caterpillars, but also to may-bugs, ants, flies, spiders, snails, frogs, lizards, and serpents. It is an error to suppose that the ants lay up provisions for winter ; the least cold benumbs them, and they continue in this state till spring. Of what use then would magazines of provisions be, seeing nature has prevented their need of food in winter ? Nor does it appear, that they collect stores for other animals. What they collect during the summer with so much care, serves not for their subsistence ; they employ it only as materials for building their habitations.

There are also several birds, which, when food begins to fail, hide themselves in the earth, or in caves, to sleep out the winter. We are assured, at least, that before winter sets in, the *strand-swallows* hide themselves in the earth ; the *wall-swallows* hide themselves in holes of trees and old buildings ; and the *house*, or *common swallows* seek for ponds, where they fasten themselves in pairs, and cling to roots or reeds, and continue without motion, and apparently without life, till the return of spring reanimates them.

There are some beasts, also, which bury themselves in the earth towards the end of summer. The most remarkable of these is the *mountain rat*, which generally lives on the Alps. Though it delights in the highest mountains, in the regions of frost and snow, it is, nevertheless, more subject than any other animal to be benumbed with the cold. Hence it is that these animals hide themselves about the end of September, or beginning of October, in subterraneous dwellings ; in which they remain till April. There is much art and precaution in their winter residence. It is a sort of gallery, the two wings of which have a particular opening ; and both terminate in a place where there is no other opening ; and this is their habitation. One of these two branches goes sloping down from the place where they lodge ; here they deposit their excrements, the moisture of which readily runs off. The other branch is more lofty, and serves them to go in and come out by. The place where they dwell is lined with hay and moss. This animal lays up no provision for winter, as it would be useless. Before they enter into their winter-

Sleep of animals during winter.

quarters, each prepares a bed of moss and hay with great care ; and when they have formed the two openings of their dwelling, they compose themselves to sleep. As long as their torpid state endures, they taste nothing. At the commencement of winter they are so very fat that some of them weigh not less than twenty pounds ; but they fall away by degrees, and are very lean in the spring.

As they eat nothing during the winter, they have no evacuations ; their *cæcum*, or first great gut, is furnished with annular valves, which retain the excrement till the time of their waking. We are informed, that as soon as these animals feel the first approach of the cold, they go to some spring, where they drink so long and so plentifully till the water which they make comes from them as pure and clear as it was when they swallowed it. A natural instinct leads them to this, to prevent the corruption which matters accumulated in their stomach might occasion during their long state of torpidity. When these animals are discovered in their retreats, they are found rolled up in a lump, enveloped with hay : their nose laid in their belly, that they may not perspire too much of their moisture ; their lymph wastes fast enough ; and it was highly necessary to have attenuated their blood by the quantity of water which they drank. During their torpid state, they may be carried away without awaking them : and they may be even killed without appearing to feel it. There is another species of rats, whose sleep is as long and profound as that of the *mountain rat* ; and which are, therefore, termed the *seven sleepers*. *Bears* eat prodigiously at the beginning of winter : and they seem to eat as if they intended to devour as much at once as would be sufficient for their whole lives. As they are naturally fat, and are excessively so at the end of autumn, this abundance of fat enables them to endure their abstinence during the winter. *Badgers* prepare themselves in the same manner for their winter repose.

The instinct of these, and other animals, teaches them how to preserve themselves without nourishment, during so long a time. From their first winter, even before they could have learnt any thing by experience, they foresee their long sleep ; and provide against it. In their peaceable retreat, they neither feel want, hunger, nor cold. They know no other season than that of summer ; and what is still more remarkable is, that all animals do not sleep thus during winter ; it is only those which, with the severe cold, can also endure an abstinence of several months. If the winter came upon them unawares, so that though enfeebled with hunger, and benumbed with cold, they still continued to live ; it might be said that there was nothing surprising in this, but the strength of their constitution. But, as they know how to prepare themselves beforehand for the time of their sleep ; and as the most of them do this with much care and precaution, we are obliged to attribute the whole to an admirable instinct, with which the Creator has endued them. Yes, the wisdom and goodness of God has provided for the wants of all his creatures : and this he can do by a thousand different ways, which the human

Sleep of animals during winter.

understanding cannot conceive. May we not conclude from this, that as he thus watches over all the works of his hands, he will not disdain to watch even for our preservation and comfort?

NOVEMBER XXVII.

USE OF STORMS.

PERHAPS there are several, who, in this stormy season, reckon winds and tempests among the disorders and scourges of nature. They do not consider the benefits which result from them; as, without them, we should be a thousand times more unhappy than we really are. Nothing can be truer than this: tempests are the proper means of purifying the atmosphere: to be convinced of which, we have only to pay attention to the general state of the weather at this season. What thick and unwholesome mists; what rainy, gloomy, and cloudy days, have we at present! Storms are chiefly designed to disperse these noxious vapours, and remove them from us: and this is, doubtless, a great benefit, which we derive from them. The universe is governed by the same laws as man; who is not improperly called *a little world*. Our health consists, in a great measure, in the agitation and mixture of the various humours; which, without this, would soon grow corrupt. The case is the same with respect to the world: that the air may not become injurious, either to the earth or to animal life, it is necessary that it should be continually agitated; and this the wind effects; I do not mean, by gentle light winds, but by storms and tempests, which collect vapours from different countries; and forming one mass of the whole, mix the good and bad together, and thus correct the one by the other.

Storms are also useful to the sea. Were it not violently agitated, the stagnation, even of salt water, would produce a degree of putrefaction, which would not only become mortal to the innumerable shoals of fish which live in it, but would also be very injurious to those who sail on it. *Motion* is the soul of universal nature; it preserves every thing in order, and prevents destruction. Were the sea itself excepted from the general rule, as it is the common receptacle for all the dregs of the earth, where so many millions of animal and vegetable substances putrefy; were it not continually agitated, its waters would putrefy, and infect every thing with their insupportable stench. Motion is as necessary to the sea, as circulation is to the blood of animals: and the other causes, which give it a gentle, uniform, and almost insensible motion, are not sufficient to purify the whole mass. Nothing but *storms* can produce this effect; and we see what great advantages result from this, not only to men, but also to many millions of other animals.

These are some of the uses of storms; and the reasons which ought to prevent us from considering them as destructive scourges and

 Use of storms.

instruments of the Divine vengeance. It is true, that storms have often destroyed vessels richly laden; destroyed the hopes of the husbandman and the gardener; laid whole provinces waste, and spread terror, desolation, and horror, every where. But what is there in nature, which has not its inconveniencies; and which may not become, in certain respects, noxious? Shall we reckon the sun in the list of the scourges of our globe, because, from his situation, the earth is for some months barren; and, at other times, his heat scorches and dries up our fields? Those phenomena of nature should only appear formidable to us, where the advantages are little or nothing in comparison of their attendant evils. But, can this be said of storms, if we consider the benefits which result from them to the earth, to men, and to beasts? Let us therefore acknowledge, that God has planned all in wisdom; and that we should be satisfied with the present constitution of things. Happy they who are convinced that every thing in the universe tends to the general good of the creatures; that the evil which may be found in the world, is compensated by numerous advantages; and that the means even which Providence makes use of to prove and chasten us, are, in themselves, indispensable benefits; the general effect of which abundantly compensates for the partial evil, which, in some particular cases, may result from them.

 NOVEMBER XXVIII.

FORTUITOUS EVENTS.

PROPERLY speaking, *chance* can produce nothing; for nothing can happen, but what has its real and determinate cause. What we call chance, then, is no more than the unexpected concurrence of several causes, which produce an unforeseen effect. Experience teaches us, that these kinds of causes are frequent in human life; unforeseen accidents may entirely change the fortune of men, and blast all their designs. Naturally speaking, it seems as if the race should be to the swift, the battle to the strong, and success to the most wise and prudent: but this is not always the case; and often an unexpected accident, a favourable circumstance, and an event which it was impossible to foresee, are more effectual than all that human power, wisdom, and prudence, can perform. How many would be to be pitied, if a wise and beneficent hand did not regulate every event? And how could God govern men, if what is called chance were not obedient to his voice? The lot of individuals, of families, even of whole kingdoms, depends often on circumstances which may appear to us little and despicable. Were we to deny that Providence governs these small events, we must, at the same time, deny that it has any influence in the greatest revolutions which happen in the world.

Fortuitous events.

We see that accidents daily take place, on which our temporal happiness or misery, in a great measure, depends. It is evident, that we cannot guard against this sort of accidents ; because we cannot foresee them. But it follows thence, that these unexpected events, which are above our understanding, are, nevertheless, subject to the empire of Providence. The wisdom and goodness of God leave us, more or less, to ourselves, according to the degrees of strength and understanding we have to conduct ourselves rationally. But, in those circumstances, where our strength and prudence can perform nothing, we may rest assured that God will more particularly watch over us for good. In all other cases, human labour and industry must concur with the aid and protection of heaven : for it is only in those unforeseen accidents, that Providence acts *alone*. And as, in all that is termed *chance*, we see evident footsteps of the wisdom, goodness, and justice of God, it is manifest that chance itself is subject to the Divine government ; and it is then that the empire of Providence appears with most splendour. When the beauty, order, and arrangement of the world, fill us with admiration, we conclude, without hesitation, that an infinitely wise Being must preside over it. With how much greater reason should we draw the same conclusion, when we reflect on those great events, produced by accidents, which the human mind could not foresee ? Have we not a thousand examples, that the happiness, and even the life of men, the fate of nations, the issue of a war, the revolutions of empires, and other similar affairs, depend on accidents, absolutely unforeseen ? An unexpected event may confound projects, concerted with the utmost secrecy and address ; and annihilate the most formidable power. It is on the well-grounded belief of a Providence, that our faith, tranquillity, and hope, must rest. Whatever the evils may be, which surround us : however great the dangers, by which we are threatened, God can deliver us by a thousand means, entirely unknown to ourselves. The lively persuasion of this consolatory truth, ought, on the one hand, to fill us with profound respect for the Governor of the world ; and on the other, engage us to seek God in all things ; to raise our hearts always to Him, and to put our whole trust and confidence in Him. This truth ought, likewise, to curb our pride ; and inspire, particularly, the great men of the earth, with that religious fear which they should have for the Supreme Being, who holds in his hands a thousand means, unknown to us, by which he can overturn the fabric of happiness, which we have so arrogantly erected. Lastly, this same truth is better calculated than any thing else, to banish from our souls all distrust, anxiety, and discouragement ; and to fill us with holy joy. “ The infinitely wise Being has a thousand ways unknown to us ; but they are ways of mercy and love ; and all his dispensations are regulated by wisdom and justice. He wills the happiness of his creatures ; and nothing can oppose his will. He commands, and universal nature is obedient to his voice.”

NOVEMBER XXIX.

THE MAJESTY OF GOD.

NOTHING is more difficult than to endeavour to form such ideas of God as are in any degree worthy of his greatness and majesty. It is as impossible for us to comprehend him perfectly, as it would be to hold the sea in the hollow of our hand; and compass the heavens with a span. Of God it may be justly said, He is both well known to, and concealed from, us. He is very nigh, and yet infinitely beyond us. Well known, and very nigh, in respect to his being; and infinitely distant and hidden in respect to his nature, perfections, and purposes. But, on this very account, it is our duty to endeavour to know his greatness; as it is necessary that we should form those sentiments of veneration for him which are his due. To assist our weakness, in this respect, let us compare him with what men esteem and admire most, and we shall see that God is infinitely above all.

We admire the power of kings; and we are filled with astonishment when we find they have conquered vast empires, taken cities and fortresses, erected superb buildings, and have been the means of the happiness or misery of whole nations. But if we are struck with the power of a man, who is but dust and ashes, the greater part of whose exploits is due to other agents, how should we admire the power of God, who has founded the earth and formed the heavens: who holds the sun in his hand, and upholds the immense fabric of the universe by the word of his power! We are, with reason, astonished at the heat of the sun, the impetuosity of the winds, the roaring of the sea, the peals of thunder, and the inconceivable rapidity of the lightning: but it is God who lights up the solar fire, who thunders in the clouds, makes the winds his messengers, the flames of fire his ministers, and who raises and calms the waves of the sea.

We justly respect those who have distinguished themselves by the extent of their genius and their knowledge; but what is the knowledge that the whole human understanding can acquire, in comparison of the wisdom of that august Being, before whom all is uncovered and all known: who counts the stars of heaven, numbers the sands of the sea; knows the path of every drop that falls from the atmosphere; and who, with one look, beholds the past, the present, and the future, in the same moment! How much wisdom shines in the construction of the universe; in the revolutions of the planets; in the arrangement of our globe; in the meanest worm; and in the smallest flower! They are so many masterpieces, which infinitely surpass the most magnificent and most perfect work of man.

We are dazzled with the splendour of riches; we admire the palaces of kings; the magnificence of their furniture; the pomp of

Majesty of God.

their clothing ; the beauty of their apartments ; and the abundance of gold, silver, and precious stones, which shine on every side : but how little is all this, compared with the riches of the Lord our God, whose throne is the heavens ; and whose footstool is the earth ! The heavens are his, and the earth also ; the habitable world, and all that dwell therein. He has fitted up dwellings for all creatures ; he has established stores for all men and all animals : he causes grass to grow for cattle ; and corn for the service of man. All that is useful and excellent in the world, is drawn from his treasures. Life, health, riches, glory, happiness, every thing that can constitute the good of his creatures ; all are in his hand and he distributes them according to his good pleasure.

We respect the great men of the earth, when they command a multitude of subjects, and reign over many countries : but what is that spot which is subject to them in comparison of the empire of the universe ; of which our globe is but a small province ; which extends over all the heavenly bodies and their inhabitants ! How great must that Master be, who has all monarchs of the universe for his servants ; and who beholds around his throne, the cherubim and seraphim ever ready to fly to execute his orders !

We judge of the greatness of men by their actions : we celebrate kings who have built cities and palaces ; who have governed their estates well, and who have successfully accomplished great designs. But how astonishing are the works of the Most High ! How wonderful the creation of this immense universe ; the preservation of so many creatures ; the wise and equitable government of innumerable worlds ; the redemption of the human race ; the punishment of the wicked, and the recompense of the good !

Who is like unto thee, O Lord ! Thou art great, thy name is great, and thy works proclaim thy grandeur ! Nothing can be imagined equal to the greatness of our God. Should not a religious reverence ever possess our souls at the thought of the presence of the Ruler of the world, the Lord, who encompasses all our paths ! The brightness of the stars is absorbed by the presence of the sun : thus all the glory, all the knowledge, all the power, and all the riches of the world vanish, when compared with the glory and majesty of God. The soul exults, and is ennobled in meditating on the greatness of the Most High. Such sublime meditations delightfully exercise all our spiritual faculties : we are filled with reverence, admiration and joy : when, in a holy transport, we represent to our minds, the Being of beings, the Eternal, the Almighty, the Infinite ! Can we help exclaiming with ecstasy, The Lord, He is God ! The Lord, He is God ! Give glory to Him for ever and ever !

 Motives for contentment.

NOVEMBER XXX.

MOTIVES FOR CONTENTMENT.

LET sweet contentment take possession of our souls. God is good : mercy and love shine through all his works. Let us contemplate his mighty deeds : the world and all it contains proclaim him : all that he has formed is worthy of him alone.

The heavens and the earth are proofs of his power : the sun who rules the day ; and the moon who rules the night ; all that is endued with motion and life, exalt the mighty God.

Consider the works of his hands ; men and brutes show that his power is infinite : even the smallest objects, the spire of grass, and the grain of dust, teach the knowledge of the Lord.

Ask the mountains, and the vallies ; the heights of heaven, and the depths of the ocean ; the winds and the tempests ; the despicable worm that crawls in the dust, and they will all proclaim his wisdom infinite, and his power unbounded !

How shall we exalt him ! With what songs of praise shall we celebrate that God, who has given us life and being ! Our bodies, and the souls which animate them, are presents from his hand : may we magnify him as long as we have a being !

Objects of his faithful care, throughout the day, each morning witnesses that he has watched over us during the darkness of the night. No moment passes without furnishing us with motives to bless him, who is the light and strength of our life.

If we be a prey to adversity, and oppressed by sufferings ; scarcely do we feel the weight of them, till the Divine power comes in to enable us to support them. His victorious strength comes to our succour ; and our difficulties are surmounted.

O my soul, thou hast long experienced this ; let it never be forgotten : never give way to the fear that thou shalt be abandoned by that God, who cannot hate any thing he has made.

Let us submit to his holy will ; and bless him for all his dispensations ; persuaded that he will accomplish his merciful designs ; for he is great in counsel, and abundant in means.

 NOVEMBER XXX.*

GRATITUDE AT THE REMEMBRANCE OF PAST MERCIES.

ALMIGHTY God : thou art the common Father of all the generations which dwell on the earth ; thou art *my* Father also. May I feel myself absolutely dependent on thee, not only in respect to my existence, but also for every thing I possess ! I bless thee, I give thee thanks for the life which thou hast granted me ; and for all the mercies which thou hast heaped upon me from the beginning until now.

Gratitude at the remembrance of past mercies.

I bless thy kind providence for my tender family, relations, and for all the comforts and benefits which I have enjoyed in domestic life.

I bless thee for the life and health I enjoy ; and for the abundant means which thou hast provided to feed, clothe, and furnish me with a convenient habitation : thou, Lord, hast provided for all my necessities.

I give thee thanks for the success, with which my just enterprises, and the labours of my calling have been crowned ; for all the blessings which thy liberal hand has daily conferred on me ; and for every thing which has in any way or measure, contributed to my preservation and temporal happiness.

I should also bless thee, that when thou didst permit adversity and affliction to approach my dwelling, thou didst not then leave me without comfort and support. In the midst of my trials, and the just chastisements which thou hast sometimes inflicted on me, thou hast not abandoned me. Thou hast softened and moderated the corrections which I deserved ; and thou hast condescended again to restore me to thy favour. Thy fatherly hand has guided me ; and thou hast rejoiced over me to do me good.

Should not the constant experience which I have had of thy goodness, fill me with perfect confidence, and encourage me to trust my soul, body, and interests in thy hands ? May I not hope that thou wilt continue to watch over me ; and that, as far as thou judgest it consistent with my real happiness, thou wilt preserve me from those ills and distressing accidents, which might disturb my repose ? May I enjoy, with a wise and grateful heart, the mercies thou grantest me ; that in prosperity I may ever aspire after thee, who art the Author of all good ! But, if thou hast determined, in the impene-trable councils of thy wisdom, that I should pass through various ills, afflictions, and disappointments, may I submit with perfect resignation to the wise dispensations of thy Providence, and glorify thee to the utmost of my power, in adversity, as well as in prosperity !

To thee, O Lord our God, to thee, who art the Father of all thy intelligent creatures in heaven and in earth, to thee be honour and glory, now and for ever !

Hymn of praise.

DECEMBER.

DECEMBER I.

A HYMN OF PRAISE.

WELL may our souls be astonished, and filled with admiration, when we reflect on the unmerited mercies which we have received from the hands of the Lord our God! Laden with his mercies, filled with transport, how can we sufficiently express our gratitude and joy!

While we were yet asleep, concealed in our mother's womb, thou didst then fix our lot: thou hast regulated the condition of mortals, before their eyes saw the light of the day: and mine was (O blessed lot!) to be born in a Christian land.

Full of compassion for our weakness, thou didst incline thine ear to our infant cries: our lips stammered thy praises; and thou didst condescend to hear what could not as yet be termed *prayer*.

When in the giddiness of youth, we wandered far from the paths of virtue, thy merciful goodness condescended to recal us to a sense of our duty.

Thou hast been our shield and fortress in danger and distress; and thou hast often preserved us from the snares of vice; more to be dreaded than the worst temporal calamities.

When threatened with death, a mortal paleness was diffused over our face; thou didst re-kindle the almost extinguished lamp of life: and when the remembrance of our transgressions tormented our souls, thy grace afforded us comfort.

Blessed art thou, who hast loved us so well: who hast given us the sweet consolations of friendship. But, what is that greatest of all benefits which the heart can conceive: for which this heart, entirely consecrated to thee, desires to exalt thee, the greatest good which can be possibly enjoyed on earth:—Is it not, my God, to be permitted to approach *thee*, to celebrate thy mercy, and to glorify the name of the Almighty?

In my fears, in my distresses, in dangers and wretchedness, I will confide in thy mercy alone. When my soul is strengthened by thee, even death itself shall lose its terrors.

When the heavens shall pass away with a mighty noise: when the fabric of the universe shall be dissolved, I shall triumph above its ruins, and bless the powerful hand that has raised me above the wreck of a crushed world. O thou Most High; eternity is too short to utter all thy praise!*

* There is a great similarity between the above hymn, (which makes fourteen verses in the German) and the celebrated hymn of Mr. Addison, which begins with, "When all thy mercies, O my God, &c." Has not the German borrowed from the English poet?

DECEMBER II.

THE ERA OF THE CREATION OF THE WORLD, AND THE FORMATION OF MAN.

IF we fix the epoch of the creation of the world, according to the testimony of the sacred writings, it can scarcely have subsisted 6000 years. Those who suppose it much older, are contradicted, both by reason, and the historic monuments which have been handed down to us. The history of the human race, does not go further back than that which *Moses* has written; for all that has been said concerning the origin of ancient nations, is advanced without proof; nor does their history extend beyond the general deluge. As to the chronological books of the *Chinese*, they are evidently full of falsities. The *Phœnicians* have no historian more ancient than *Sancho-niatho*, who lived after *Moses*. The *Egyptian* history does not extend beyond *Ham*, the son of *Noah*; and the books of the *Jewish law-giver*, are not only the most ancient, but also the most authentic of all the monuments of antiquity. If the world were some thousands of years older, it must be much better peopled than it is at present. Population has always increased since the deluge, and yet there might be three times as many more inhabitants on the earth, than it at present contains. It has been computed, that at least 5000 millions of men might live at once on our globe: and yet it does not appear, that there are really more than 1080 millions. In *Asia*, are reckoned 650 millions: in *Africa* and *America*, 300 millions: and in *Europe*, 130 millions.

If we consider the arts invented by men, we shall find that few or none of them have been discovered more than two or three thousand years. Man owes not only to his nature and reason, the aptitude he has for acquiring arts and sciences, but he is also led to this by necessity; by the desire he has to procure himself conveniencies and pleasures; by vanity and ambition; and by luxury, the child of abundance, which creates new wants. This propensity is evident among all men, in all ages. History carries us back to the time when men had scarcely invented the most necessary arts; when those arts which were known, were but very imperfectly understood; and in which they scarcely knew any thing of the first principles of the sciences.

About four thousand years ago, men were still in a state of great ignorance, concerning most subjects: and if we calculate according to the progress which they have made since that time, and afterward go back to the remotest periods, we may with tolerable exactness fix the era, when men knew nothing: which is, in other words, that of the infancy of the human race. Were their existence to be carried higher, it is utterly improbable that the most useful and necessary arts should have continued unknown to them through such a long series of ages. On the contrary, all that can be discovered by the

human mind, must have been known a long time ago. From this circumstance, therefore, we must conclude, that the origin of the human race can have no other era than that which *Moses* has assigned it in his history of the creation. Would it not be absurd to suppose, that men during the course of so many thousand years could have remained enveloped with the thickest darkness, and plunged in a sort of lethargy, from which they suddenly awoke, and began to invent arts to procure themselves the pleasures and conveniences of life?

Another circumstance should be remarked here: almost all Europe was formerly covered with immense forests: very few cities, towns, or villages being found in it. It is manifest that it must be better peopled now, than it was at that time. Germany, for instance, was then but one great forest: judge, therefore, what a desert it must have been! At first, men could only sow vacant places which were found here and there in the forests: they had no separate property, and changed their place of residence every year. In all Germany there was not a single fruit tree. Acorns alone prevailed. If we wish to draw a parallel between ancient and modern Germany, we must first put aside the inhabitants of its cities and towns; pay attention to the numerous colonies which Germany has sent to other countries; observe, that most of the forests being now cut down, and converted into arable ground, ancient Germany could scarcely have had one tenth part of the cultivated ground which it at present contains: and, consequently, could have had but one tenth part of its present number of inhabitants. How many millions less of men at that time, than now! And how abundantly must they have been multiplied since! And yet, the forests which extend from Germany to the north east of Asia, and those that remain still in Africa and America, prove that the earth is not as well peopled as it might be. The further we go back into antiquity, the less we shall find the world peopled, and the earth cultivated: till we arrive at the epoch of the birth of the human race. It is therefore impossible, that our globe should have been eternal; for, had it been so, it must have been as well peopled from time immemorial, as it is at present.

All these considerations lead us to him, who is the Creator of the heavens and the earth. From him, the world and its inhabitants, derive their being. All things were made by him, and he was, before worlds of creatures existed; and shall be eternally the same, when new worlds and new earths shall be produced. And shall we not also live for ever! Delightful and transporting thought! When the heavens shall pass away, I shall remain! And while eternity rolls on, I shall be found in the realms of beatitude!

DECEMBER III.

THE UTILITY OF DIFFERENT KINDS OF TIMBER.

HOWEVER great and numerous the advantages may be which we derive from every part of a tree ; yet there is none that can be compared with that which the wood itself affords us. It grows in such abundance that we may justly say, God every day provides a new supply, that we might never be destitute of so useful a substance. It answers every end we wish to accomplish by it. It is pliant enough to take every sort of form we desire ; and rigid enough to keep that form we have given : and as it is easily sawed, bent, and polished, it furnishes us with many utensils, conveniencies, and ornaments.

But these are far from being the most important advantages, as the greater part relate only to purposes of convenience and luxury : we have wants of a more pressing nature, which we could not supply, had not wood a proper degree of thickness and solidity. Nature, it is true, supplies us with a great many heavy and compact bodies ; we have common stone and marble, which we may apply to various uses ; but it is so difficult to raise them out of their quarries, to drag, and hew them, that they become very expensive ; whereas we can, with much less trouble and cost, procure the largest trees. Wooden piles, from sixty to ninety feet long, sunk down in the earth, make a sure foundation for walls, which without this precaution, would sink into the clay, or tumble down, where the foundation was sandy. These piles, forcibly driven down and made firm, constitute a forest of immoveable and incorruptible trees, which support the most heavy and extensive buildings ; other pieces support the stone-work, and all the weight of tiles, lead, &c. which form the roofs of our houses.

Wood is also a preservative of life, as it is with many the principal fuel ; without which they could neither preserve life, nor supply one half of their necessities. It is true, that the sun is the soul of nature : but, it is impossible for us so to collect his rays, as to dress our food, or melt our metals. Fire-wood, in some measure, supplies the place of the sun ; and the regulation of the degrees of heat depend on our own choice. The long nights of winter, the cold mists and the north wind, would freeze our blood were we deprived of the comfortable heat produced by wood. How necessary then is wood ; and was it not for the wisest purposes that the Creator of the world has covered so great a part of the earth's surface with forests ?

But, do we consider wood in its various uses, as a blessing from God ? Have we properly reflected on the benefits we derive from it, and acknowledged that they contribute much to our wellbeing ? Or, because these blessings are so common, have we not considered them as of little importance ? It is true, that we can get wood more easily than gold or diamonds : but, is it, on this account, a less

 Utility of different kinds of timber.

peculiar blessing of Providence? Are we under less obligations to return thanks to God for it: or is it not this very abundance, and the ease with which it is acquired, which should excite us so much the more to magnify the Creator for this precious gift; the quantity of which is proportioned to our necessities? These reflections may become a fruitful source of thanksgiving, if we only accustom ourselves to indulge them in a lively, serious manner. The winter would furnish us with many blessed exercises of piety, were it our delight to meditate on the mercies of God; and especially on those which he grants us at this season. While reflecting on the warmth, which wood affords us in countries where pit coal is not to be found, would it not be natural to expect, that we should thus address ourselves to God: "Compassionate Father! This also is one of thy blessings: I receive it from thy hand, with a lively sense of gratitude; and I acknowledge thy providential care in this gentle warmth, by which my frozen limbs are invigorated. Whether I feel the scorching rays of summer, or the piercing cold of winter; whether I breathe in the open air, or in a warm apartment, thou always showest thyself my benefactor. O, let me not forget any of thy mercies! And as, in each season of the year, I receive peculiar marks of thy goodness, may I glorify and bless thee at all times! Let me never consider even fire-wood with indifference; but may the use which I make of it, be a constant motive to induce me to exalt thy goodness!" These devout reflections are so far from being unnatural, that it would be utterly inconsistent, both with religion and reason, were they not frequently cultivated in our minds.

 DECEMBER IV.

REMARKABLE PROPERTIES OF CERTAIN ANIMALS.

WE daily enjoy a variety of advantages which we derive from certain animals. The Creator has given us some to live in a state of society with us, and others to nourish us: and all are designed, in one way or other, to minister to our necessities or pleasures.

The *dog*, is far from being a despicable animal. Independently of the beauty of his form, his vivacity, strength, and swiftness; he has all those internal qualities, which may attract the notice of man. He possesses exquisitely tender feelings, which education still improves, and which render him worthy of being a companion for man. He knows how to promote his designs, watch for his safety, defend and flatter him by turns, and by assiduous services, and repeated caresses, render himself pleasing to his master. Without the assistance of this faithful domestic, man could not so easily vanquish and tame the other animals. In a word, it seems as if God had given the dog to man, to serve as a companion, a help, and a guard. This very interesting animal, merits our attention in other respects, and particularly

 Remarkable properties of certain animals.

in this, that he performs several actions, which prove he is not a simple machine : but, that he possesses a self-moving principle. How expressive are the signs by which he manifests his joy at his master's return ! But, these signs are widely different from those which he discovers when he sees a thief, or a wolf ; or when he is pursuing a hare. What cautious ardour, what cunning and prudence, do we observe in all his motions !

The advantages which we derive from the *sheep*, are still more considerable, although it has not the gift of pleasing like the dog. Every part of the sheep is useful ; its milk, wool, flesh, and even its bones. What is most remarkable in this animal is, that it ruminates, or chews the cud. As it swallows its food hastily, without sufficiently chewing it, it can bring it up again, re chew and swallow it a second time. The cause of this is, its having but one row of teeth : but, this defect is compensated by the multiplicity of its stomachs. Of these, the sheep has *four*. In the first, which is called the *paunch*, and is very large, the food, which is raw, and almost whole, is a little moistened. The second, which is named the *cup*, or *hood*, is much smaller ; in it, the food is better macerated, and digestion begins to make some progress. From this it passes into the third stomach, called the *leaf*, or *folds* ; in this it continues till it is properly soaked and dissolved ; for, this intestine is composed of many folds, or leaves, which permit nothing to pass but what is fluid. Finally the digestion is perfected in the fourth stomach, which is called the *rennetbag* ; in this the food changes its colour, and becomes as white as milk ; though in the third stomach it was quite green.

The *hare* is neither destitute of instinct to provide for its own support, nor sagacity to escape from its enemies. It makes its own *form*, or bed ; and in winter chooses those places which are exposed to the south ; and in summer the north. In order to hide itself, it squats in furrows, between hillocks ; which are nearly the colour of its own fur. When it is hunted, it runs for a while rapidly forward ; then it returns on its own steps, throws itself into bye-paths, and after many leaps and doublings, hides itself in the trunk of a tree, or in a bush. It has cunning enough to change the place of its residence continually, according to circumstances.

The *stag* has more cunning and subtlety even than the hare ; and gives still more trouble to the huntsman. Its elegant light form, its slender, well proportioned shape, its branching horns, which serve it more for ornament than defence ; its size, swiftness, and strength, distinguish it from all the inhabitants of the woods : and it seems to have been made to embellish and enliven the solitude of the forests.

When we reflect on these, and innumerable other animals, we must acknowledge more and more, with what goodness the Lord has provided for our support, convenience, and pleasure. Our globe is the habitation of a multitude of creatures, which are, in general, subjected to man, and exist only for his service. And if the soil is so diversified, it is that a greater number of living creatures may find aliments

 Remarkable properties of certain animals.

sued to their respective natures. Are not all kinds of soils, the good and the bad, the sandy and the marshy, the rocky and the clayey, from the banks of the rivers to the tops of the mountains, stocked with animals, which are in one way or other useful to man? *Fowls* are fed with the fragments from our tables, from which we derive great advantages. The delicate flesh of *pigeons* pays us with interest for the expense we are at in procuring them convenient and safe retreats. *Swans* free our ponds from a multitude of plants which would corrupt there. Hosts of *ducks* and *geese* yield their feathers to us for beds: and they only ask, as a return for their spoils, a little poor food, and a pond where they may wash, play, dive, and seek for worms.

In a word, there is no place, how parched or barren soever it may be, but produces various animals, which are useful to man. Can we then forget the riches of the Divine goodness? The sight alone of the animals which have been created for our use, is sufficient to make us blush with confusion. Let us not receive these benefits with an insensible heart. In all gifts of nature, let us taste and see that God is good; and ever use his mercies with a heart penetrated with gratitude. "The earth presents itself to our eyes as the domain which thou hast assigned us; every surrounding object of which was made for our use! Lord, what is man, that thou art mindful of him, and the son of man, that thou carest for him? Though he be a little lower than the angels, yet he is thy child. Thou makest him a partaker of thy happiness; thou crownest him with glory and honour; thou hast put all things under his sway; and the whole creation honours, and acknowledges him for its monarch. The fierce bull whose bellowings are heard from afar; the gentle sheep, the wild beasts which traverse and adorn our forests; the fowls which people the air; and the shoals of fish which fill the rivers and the sea; all are obedient to his will; and all were created for his use."

 DECEMBER V.

THE FORMATION OF SNOW.

SNOW is a species of *hoarfrost*, different only in this, that the hoarfrost falls in the form of dew on the surface of certain cold bodies, which attract its humidity, and to which it remains fixed; whereas snow is formed, before it falls, by congealed vapours in the middle region of the air; which vapours follow the same laws in falling, as fogs, dew, and rain. The air is often excessively cold; and this cold may sometimes be considerably increased by the density of the atmosphere, and by the accession of nitrous vapours. It is therefore easy to comprehend how the aqueous particles become congealed. But, what contributes perhaps more than any other thing to give that freezing property to the air, are the clouds: for, in general, every snowy

Formation of snow.

day is a cloudy one ; now the denser the clouds are, the more they intercept the sun's rays, and prevent their action. In consequence of this, the cold may become intense enough to cause the vapours to lose their fluidity, and convert them into snow. But, from the same reason should we not sometimes have snow in summer ? It may undoubtedly happen that, even in the midst of summer, snow may be formed in the higher regions of the atmosphere. But, it is never sufficiently cold, in this season, so as to prevent the icy particles from melting in their passage through the lower regions of the air : therefore they cannot appear to us under the form of snow. But, this is not the case in winter ; as it is then very cold, even in the lower regions of the atmosphere, and on the earth's surface ; and, as the congealed vapours cannot receive, in their fall, sufficient warmth to melt them, they continue to preserve their snowy form.

The shape of the flakes is very remarkable. They generally resemble little stars of six equal rays. It is difficult to assign a reason for this regular figure. Perhaps the cause ought to be sought for in the saline particles which float in the air ; and which becoming united to the snow, cause it to crystallize : and then the congealed vapours assembling round these saline particles, which serve them as a sort of nucleus, they assume the hexagonal form. When the lower air is very cold, these little stars fall separately ; but when the air is more temperate or moist, they melt a little, and, coming into contact, freeze together, and thus form flakes of different sizes, according to the number of stars which happen to meet together. This is the reason why the snow never falls in large flakes, when the cold is intense.

An attentive observer cannot help admiring the Divine power and wisdom when he considers that the most exact proportions, and the most perfect regularity are attended to, even in the formation of the particles of snow ! How great would our surprise be, were we to see them for the first time, and be told that this brilliant meteor was owing to some vapours in the atmosphere ! How suddenly does that snow, with which we are encompassed, fall without our having foreseen it ! What a multitude of flakes fall from the atmosphere, throng one another, and in a few minutes cover the ground ! While this presents a pleasing object to the eye, and abundant matter of reflection to the mind, it is well calculated to justify what the pious *Brookes* has said, " Frost and snow have their charms ; and the winter its sweets. Pure and innocent pleasure can never be unknown, except to those stupid men who reflect upon nothing : and pay no attention to the works of the Lord."

DECEMBER VI.

* WINTER PLANTS.

IT is a mistaken opinion, that winter is, in general, destructive to plants and trees. On the contrary, it is certain that the variations of heat and cold contribute much to the propagation and increase of vegetables. In warm climates, there are immense deserts, which would be still more barren if cold did not succeed to the burning heats. The winter, far from being prejudicial to the fertility of the earth, favours and increases it. Cold countries have (notwithstanding their snows and frosts,) plants which thrive well. A great many trees, as for example, the *fir*, the *pine*, the *juniper*, the *cedar*, the *box*, and the *larch*, grow as well in winter as in other seasons ; and this was necessary, that the forests might furnish us with a sufficiency of wood and fruit. *House-leek*, *stone fern*, *sage*, *marjoram*, *thyme*, *lavender*, *dwarf wormwood*, and other similar plants, preserve their verdure during the winter. There are also certain flowers, which grow under the snow. The *single anemone*, the early *hellebore*, the *cowslip*, the *primrose*, the *winter hyacinth*, the *narcissus*, the *snow-drop*, and all sorts of *mosses* grow green, and flourish in the cold. Botanists assure us, that the plants of the frigid zone, if put in a greenhouse, cannot bear a heat of more than 38 degrees : that they bear the cold so well that they grow in *Sweden* during the winter ; as well as in most parts of *France*, *Germany*, *Russia*, and the northern parts of *China*. Vegetables of excessively cold climates cannot resist the heat : nor can those which grow on the tops of very high mountains in any country. Mountains and rocks, whose tops are covered with snow during the whole year, are not without their peculiar plants. On the rocks of *Lapland*, many of those vegetables grow, which are found on the *Alps* and *Pyrenees* ; on *Mount Olympus*, and in *Spitzbergen*, but no where else. When they are planted in a garden, they grow very tall ; but bear little fruit. Few of the plants, which thrive best in the northern countries, can come to any perfection without snow.

Thus, in the vast garden of nature, there is no soil which is entirely barren. From the finest mould, to the hardest rocks ; from the warmest countries under the line, to the coldest climates of the north pole, there is no kind of soil, but what produces plants peculiar to itself. And there is no season absolutely without flowers and fruit.

Merciful Creator ! Permit us not, even in this severe season, to forget thy paternal care ; and let us not close our eyes to the blessings which thou hast so liberally bestowed upon us ! Were we as attentive as we should be to the government of thy Divine providence, we should at all times, and in all places, find motives sufficient to induce us to remember with gratitude, the wisdom and goodness of thy conduct towards us. Nature is never either idle or barren. In all seasons it continues its labour : grant, gracious God, that it may be

 Winter plants.

the same with us, in every stage of life ! And should we be permitted to arrive at old age, let us neither be unfruitful, nor uninstructional to the world !

 DECEMBER VII.

 AN EXHORTATION TO REMEMBER THE POOR DURING THE SEVERITY OF
THE WINTER.

YOU who are sitting quietly in convenient and comfortable apartments ; who hear the keen north wind whistle round your dwellings ; reflect on the state of many of your unhappy fellow-creatures, who are at present suffering the utmost severity of cold and poverty. “ Happy they, who in this rigorous season, have a house to shelter them, clothes to keep them warm, wholesome bread, and the fruit of the vine to cheer and strengthen them ; and a soft and comfortable bed, on which they may rest, and enjoy pleasing dreams. But, unhappy the poor man, to whom adversity refuses the necessary shelter ; without clothing to keep him from the cold ; often extended on a bed of sorrows, and too modest to make his necessities known.” How deeply should we feel the misery of such people ! Let us attend to those objects of compassion, who come to our doors :—how many are feebly crawling through the streets, tormented with hunger and cold ! How many old people, with scarcely enough to cover their shivering limbs, exposing themselves for hours together to all the inclemency of the season, in order to solicit the smallest donation from those who pass by ! How many sick people are there without food or medicine ; lying on beds of straw, in miserable cabins, cellars, and garrets, where the wind, the cold, and the snow, are their principal visitants !

Winter renders charity to the poor still more necessary, because, in this season, their wants are increased. Is not this the time, when even nature itself is impoverished ? And will it not add a double value to our benefactions, to distribute them seasonably ? If the summer and autumn have enriched us with their produce ; is it not that we might share these blessings with our brethren, now, that nature is at rest ? The more the cold increases, the more we should be disposed to relieve the necessitous ; to pour into the bosom of the indigent a part of the surplus which we have amassed. What other intention could Divine Providence have in its unequal distribution of worldly good, but to put it into the power of the affluent to feel for, and relieve the necessities of their fellow-creatures ?

Let us have pity therefore upon the poor : and not permit them to suffer even more than the brutes do ! It is our duty to mitigate their sufferings : Providence has condescended to grant us that honour. Let the rich understand, that it is their duty and privilege to feed, clothe, warm, and cherish the distressed : to support them in their

An exhortation to remember the poor during the winter.

sufferings, and to snatch them from death. Let those who have abundance, share of that abundance : and let those who have but little, give of that little. One can scarcely be so poor, as not to be able to do some good. Let us taste the sweetest satisfaction that a noble mind can feel : the divine pleasure of providing for the necessities of the poor ; of sweetening to them the rigours of winter, and lessening the pressure of adversity. Who can withhold from himself the consolation of relieving the wants of the destitute which in so many cases, may be so easily effected ? We need only retract a few of our expenses in food, raiment, and pleasures. What a blessed offering would this be to God, were our beneficence to be accompanied with a victory over our passions, in retrenching the expense occasioned by luxury and vanity, in order to apply it to the relief of the poor !

Let each strive, during these winter days, to relieve, as far as he possibly can, the misery of his fellow-creatures. Let our comforts and conveniencies cause us often to think of those, who are destitute of the greater part of the sweets of life. In comparing our situation with that of others, we shall feel more powerfully our own happiness, and bless God with redoubled fervour for the great comfort we enjoy. Then, if the charitable disposition of our heart be not depraved by the world, or corrupted by passion, we shall be led to make as many happy as we possibly can ; and to alleviate those ills, which we cannot entirely cure. We should frequently ask ourselves : What are the comforts which we desire, in this inclement season ? They are the very same which we should, if possible, procure for our indigent brethren. Do we know any who have not sufficient clothing to preserve them from the cold : if so, should we not employ that part of our garments which only minister to luxury or pride, to clothe, or procure clothing for them ? Do we sleep on a comfortable bed, while so many of our fellow-creatures are without any ? Should we not then be willing to lie less comfortably, in order to procure the restless and destitute some refreshing sleep ? Do we feel the cheering warmth of a comfortable dwelling ? Why then should so many others shiver with cold ? Should we not make use of the most effectual and speedy means in our power, to alleviate their distresses and to sweeten the bitterness of their lot ?

DECEMBER VIII.

NATURE IS A SCHOOL FOR THE HEART.

IN every respect the study of nature is profitable ; with propriety it may be called *a school for the heart* ; seeing it in a certain sense, teaches us the duty we owe to God, to our neighbour, and to ourselves.

Can any thing inspire a deeper veneration for the Supreme Being, than the reflection, that it is he who has not only formed the globe of

Nature is a school for the heart.

the earth out of nothing, and suspended it in the empty space, with all the creatures it contains : but whose mighty hand also confines the sun in his place, and the sea within its shores : can we humble ourselves too much, in the presence of that Being, who has created the innumerable worlds which roll above our heads ! What despicable creatures are we, when compared with those immense globes ! And how mean does the earth, and all its glory appear, when considered in this point of view ? Should we not shudder at the bare thought of offending this God, whose unbounded power every moment meets our eyes ; and who can, with one look, destroy or render us the most miserable of all his creatures ! But the contemplation of nature is also blessedly calculated to fill us with love and gratitude to its Author. All nature, with a loud voice, proclaims this consolatory truth,—**GOD IS LOVE.** It was this love that induced God to manifest his glory in the creation of the world, and to communicate to other beings a portion of that felicity which himself enjoyed. On this account he created the universe, and an innumerable multitude of beings, that all, from the archangel to the worm, might prove, according to its nature and capacity, and might feel the effects of the Divine goodness. Is there a creature which does not exhibit proofs of this amazing goodness ?

But we ourselves are particularly instances of it :—the Creator has endued us with reason, not only to enable us to enjoy his benefits, but to acknowledge and feel that love with which he has honoured us ; and which infinitely increases the value of all his blessings. He has decreed that man should rule over the animals, and make them subservient to his wants and conveniencies. It is for us the earth produces fruit in such abundance. From him we receive those innumerable daily benefits, to which we owe the continuance of our lives. His love is disinterested : for, he can receive nothing from his creatures : his felicity can admit of no increase. Can these considerations fail to affect us, to excite our gratitude, and to engage us to return love for love to our beneficent Creator ? Lastly, the contemplation of the universe, and the perfections of God, which are manifested in it with so much splendour, should naturally increase our confidence in him. How great should our tranquillity be, when we consider that our lot is in the hands of that Being, of whose power, wisdom, and goodness, we have as many proofs as we have creatures before our eyes ? Can there happen any perplexity, embarrassment, or danger, from which we cannot be delivered by the hands of him who stretched out the heavens, and formed all his creatures in so admirable a manner ? And need any thing prevent us from having recourse to him in all our necessities and tribulations ; with the full assurance that he will hear our prayers ?

Is it possible for mean and selfish sentiments to lodge in the heart of that man, who, in contemplating nature, discovers every where footsteps of the infinite beneficence of that Great Being, who does not propose less the particular happiness of each individual, than the

Nature is a school for the heart.

general good of the universe! Even a superficial contemplation of the ways of Providence, must deeply impress the mind with a sense of the goodness of God, and his tender concern for all that exists. And the heart must be extremely depraved, which under a conviction of this universal beneficence of the Creator, is not inspired with the determination to imitate him. Should we not, according to the Divine example, feel sincere good-will to all his creatures. "God causeth his sun to rise on the evil and the good; and sendeth his rain on the just and the unjust." Can we then exclude any from our charity; or be partial in the distribution of its effects? God loves the little as well as the great; the poor as well as the rich; and he does good invariably to all. If, therefore, we wish to imitate our heavenly Father, should we not endeavour to get a love as general and disinterested lighted up in our hearts?

Finally, when we contemplate the admirable order and harmony which reign through all nature, should we not be led to pray that the dispositions of our minds might resemble it? If we be well convinced that nothing can please God, which is not according to order; should we not apply ourselves, with all our power, to be conformed to his will? How despicable should we be, even in our own eyes, if through our fault we produce any derangement in the admirable plan of nature? God wills our perfection: should we not feel ourselves obliged to be conformed to his merciful designs; and in order to this, make a proper use of every mean which nature and grace have afforded us? This should henceforth be our great, our principal occupation. As often as we discover any irregularity in our hearts, or ways, we should incessantly labour to have it corrected, and thus be workers together with the saving influences of the spirit of God.

Thus nature may become an excellent school for the heart. Should we not be attentive to its instructions; and profit by them in a teachable spirit? Here we may learn true wisdom, that wisdom which is never accompanied with disgust, or irksomeness: we may learn to know God, and find, in this blessed knowledge, the foretastes of paradise. Thus our days may pass sweetly away, till we are introduced into that world where we shall no longer be confined to the first rudiments of science; but where our knowledge and holiness shall be more and more perfect through all eternity.

Note.—The above may do very well in its place: but without the assistance of Divine Revelation, no man can thoroughly know the only true God, and Jesus Christ whom he has sent: whom to know, as the Scripture has revealed him, is life everlasting.

A. C.

Divine goodness manifested in things apparently hurtful.

DECEMBER IX.

THE DIVINE GOODNESS MANIFESTED TO US, EVEN IN THINGS WHICH
APPEAR HURTFUL.

MOST people wish that they were not exposed to any evil in this world. If they had their choice, and could dispose their lot at pleasure, they would endeavour to secure to themselves a life exempt from all kinds of trouble and affliction. But, is it really true that we should certainly be happy, if nothing happened to disturb our worldly prosperity and repose ; and that we should, during the course of our lives, be exempt from all disagreeable occurrences ? This question, on the decision of which our happiness here below so materially depends, deserves to be examined with care ; at the same time guarding, as much as possible, against the illusions of self-love.

Should we be really happy, were we to enjoy uninterrupted prosperity in this world ? I think not. Constant prosperity would soon grow insipid : and disgust would change our felicity into real misery. On the contrary, the evils which we sometimes suffer, enhance the value of our blessings, as colours are relieved and set off by shades. Were there no winter, would we be so affected as we are by the charms of spring ? Can we know the value of health, without sickness ; the sweets of rest, without the pains of labour ; the peace and consolations of a good conscience, if we had never been tempted and tried ? The more obstacles are opposed to our happiness, the greater is our joy, when we have been enabled to surmount them. The heavier our calamities are, the more happy we feel when delivered from them : and the satisfaction, which in such cases, we often feel, makes us shed tears of joy. Besides, if the afflictions, of which we complain, did not happen, we should certainly be exposed to incomparably greater evils. If all our days were prosperous, we should soon be lost in pride, luxury, and ambition. If we were never pressed by want, none would take the trouble of being active and laborious in his vocation. None would exercise his talents, or cultivate his mind : and none would be animated with zeal for the public good.

If we were never exposed to danger, how should we become prudent ; and how could we learn to feel for those whose lives are exposed to danger ? Had we no ills to apprehend, intoxicated with prosperity, we should easily forget gratitude to God, charity to our neighbour, and all our duties in general. Are not then these virtues, these mental accomplishments, a thousand times preferable to a continual train of agreeable sensations from outward prosperity, which would soon appear dull and insipid, because uninterruptedly enjoyed. "He who always reposes in the lap of prosperity, soon becomes backward to all good ; and incapable of performing any great action : but let him feel the strokes of adversity, and he will return to wisdom, activity, and virtue."

Divine goodness manifested in things apparently hurtful.

How unjust and inconsistent are the desires of men ! They wish to live quiet, contented, and happy ; and are discontented with the means which lead to the accomplishment of their own desires ! In the heats of summer, we pant for the refreshing breeze ; and yet we are displeased with the storm that cools and refreshes the air. Thunder purifies the atmosphere, and renders the earth fruitful ; yet we complain that the flashes of lightning terrify our minds. We acknowledge the use of coal, sulphur, minerals, and warm baths ; but we do not like earthquakes. We wish that there were no contagious, no epidemic disorders, and yet we complain of those tempests which prevent that corruption of the air which produces them. We wish to have servants ; and yet we desire that there should be neither poverty, nor an inequality of station in the world. In a word, we wish to have every end accomplished, without the use of the means which lead to it.

Acknowledge, O man, the wise and beneficent designs of thy God ; even when he permits thee to feel the frequent vicissitudes of joy and sorrow, of prosperity and adversity. Is he not the Arbiter of our lot :—the Master who can punish or reward :—the Father, from whose tender love even our chastisements themselves must come ? Are we not in a world, one peculiar characteristic of which is to be subject to continual changes and revolutions ? Have we not often found in the course of our life, that what our ignorance considered as an evil, really contributed to our true happiness ? Let us, therefore, receive with meekness from the hand of God, those afflictions which he thinks proper to dispense. They appear dreadful only in their beginnings : but the more we are exercised by them, the more supportable we shall find them, and experience their most salutary effects. If, in adversity, we have faith and patience, we shall, in the end, be enabled to bless God for the afflictions he has sent us. However it may be, we shall certainly bless him in eternity for all our sufferings. There, we shall form a different judgment of the troubles we have passed through here below. We shall then see, that without the afflictions of which we now complain, we should never have arrived at that state of felicity which God has designed for us. “ There, our complaints and our sorrows shall cease for ever. There, transported with gratitude and joy, we shall offer songs of praise and thanksgiving to God, for all the afflictions we have patiently suffered here below. There, we shall exclaim in holy ecstasy :—All is finished, all is well ! God has done all things in infinite goodness and mercy.”

DECEMBER X.

CASUAL REVOLUTIONS IN OUR GLOBE.

NATURE, of itself, is continually producing changes on the surface of the earth, which have a great influence on the whole globe. Many ancient monuments prove, that in various places its surface sinks down, at some times, suddenly, at others, gradually. The wall built by the Romans, in the second century, between the river *Forth* and the river *Clyde* across *Scotland*, is at present, almost entirely buried under ground; remains of which are daily discovered. Mountains, those pillars of the earth, are exposed to similar ruin; occasioned sometimes by the nature of the soil; at other times by water, which saps their foundation; and lastly, by subterranean fires. But, if some parts of the globe sink down, others, on the contrary, become more elevated. A fruitful valley at the end of a century, may be converted into a marsh, where clay, turf, and other substances, form layers upon each other. Lakes and gulfs are converted into dry land. In stagnant waters, rushes, weeds, and different plants grow: animal and vegetable substances putrefy in them; and gradually form a kind of mud and mould; and the bottom rises up so that solid earth takes the place of water.

Subterraneous fires also produce great changes on our globe. The effects are perceived by three different commotions, which are generally felt separately; but which sometimes come all together. The first consists in a horizontal motion, forwards and backwards. When these oscillations are violent and unequal; they throw down buildings, and change the surface of the ground. This kind of undulatory motion may be easily discerned in the water. There are other earthquakes, called *shocks*, or *tossings*. These sometimes cause new islands to arise suddenly from the bottom of the sea. The outward crust of the earth being violently pushed up, falls down lower than before, breaks into chasms, and thus forms lakes, marshes, and springs. Lastly, there are explosions similar to those of mines, accompanied with inflammable matter. These violent shocks and convulsions often cause great devastations; and make considerable changes on the surface of our planet. The outward crust of the earth cleaves in different places; sinks on one hand, and rises on the other. The sea partakes of these commotions: but the most sensible effect which we perceive in it, is the formation of new islands. They are produced by the elevation of the bottom of the sea; or, are composed of pumice-stones, calcined rocks, or other matters projected from volcanos. History informs us, that through earthquakes produced by subterranean fires, whole cities have been swallowed up, and buried sixty feet deep; so that the earth that covered them, became afterward arable ground.

Many other alterations produced on our globe, have been occasioned by the motion of waters. Heavy rains soak into the moun-

Casual revolutions in our globe.

tains, and wash away a great deal of earth ; which being swept down into rivers, and into the sea, raise the bottom of them considerably. Rivers also change their course : coasts themselves are sometimes displaced. Sometimes the sea retires, and leaves whole countries dry, which were before its bed : at other times it gains on the land, and whole districts are inundated. Places which were formerly contiguous to the sea, are now a great distance from it. Anchors, and cast iron rings to moor vessels, and the remains of ships which are found on the mountains and marshes, at a great distance from the sea, incontestably prove, that many places formerly covered by the sea are, at present, solid land. There is every appearance that England was once joined to France : the beds of earth and stone which are the same on each side of the streight between *Dover* and *Calais*, and the shallowness of the sea between those two places, seem strong indications of this. Climates also, produce great alterations on the globe. Between the tropics, the heats and rains are alternate. In some places it rains for several months together ; and at other times the heat is excessive. The countries in the vicinity of the pole, undergo great changes, through the intenseness of the cold. In autumn the water penetrates through a multitude of little crevices in the rocks and mountains : there it freezes in winter, and the ice dilating and bursting, makes great havock.

Such revolutions, produced by accidental causes, are palpable proofs of the frailty of the earth itself. They prove also, that God is not an idle spectator of the alterations which take place on our globe ; but that he has arranged, and continues to direct every thing according to infinitely wise laws. Hence we may also learn, that all beings here below are subject to continual vicissitudes. We see even, that frequent accidental revolutions cause not only the inanimate, but all the animate world to assume a new appearance. One generation disappears, and gives place to another. Some rise to dignities and honours, while others fall into misery and contempt. There are continual changes and migrations among the different creatures : and various gradations in their condition and faculties. God has allotted to all beings different periods of duration : some are appointed to a short and momentary existence, others to a long life, and others to an endless duration. In all this, how evidently do the wisdom, power, and goodness of the Creator shine forth !

DECEMBER XI.

GRATITUDE FOR OUR CLOTHING.

PROVIDENCE manifests itself even in our clothing. How many animals give us their hair, wool, fur, or skins, to cover us ! The sheep alone with its wool, furnishes the most necessary part of our dress : and it is to the valuable labours of a worm, that we owe our silks. How many plants also serve for the same purpose. Hemp

Gratitude for our clothing.

and flax furnish us with linen : and many different stuffs are made out of cotton. But these vast stores of nature would not have been sufficient, had not God endowed man with industry, and an inexhaustible fund of invention ; and given him hands capable of preparing clothing of different kinds. Let us only reflect on the labour requisite to produce one piece of cloth, and we shall see that it demands the united exertions of a multitude of hands to prepare even a few yards. How little cause have we to be vain of our dress, seeing we are obliged to have recourse to the most despicable animals for the materials out of which it is made ; and to that class of people, as workmen, which our pride despises the most.

But, why has the Creator laid us under the necessity of providing for ourselves, while all other animals receive theirs immediately from nature ? I answer : this obligation is very advantageous to us : on one hand, it is favourable to our health ; and on the other, it is suited to our manner of life. We can thus regulate our garments according to the different seasons of the year ; the climate where we live ; and particularly, according to the situation or profession we have chosen. Our garments promote insensible perspiration, so essential to the preservation of our life. The necessity of procuring them ourselves, exercises the mind, and gives birth to the invention of many arts : and lastly, the labour they require provides subsistence for a multitude of workmen. We have, therefore, the utmost reason to be satisfied with this arrangement of Providence. Let us only take care not to forget its design in furnishing us with clothing. A Christian should not seek his glory in the outward ornaments of his body, but in the virtuous dispositions of his soul. The proud person assumes a thousand different forms, and inwardly glories in the most frivolous advantages : attributes excellencies to himself which he has not, or rates too highly those which he has. As to the outside, some show their pride in the splendour of silks, gold, and jewels ; whilst others nourish it under rags. The true Christian avoids both these excesses. The first is supremely foolish : for it is degrading to human nature to seek glory in outward ornaments. We wear clothes to preserve our bodies from the intemperature of air ; a precaution which the weakness of man, since his fall, has rendered necessary, not only for health and decency, but also to distinguish the sexes, and to establish those distinctions which are necessary in the different orders of society. These are the rational ends for which our garments have been designed, and we should use them only for the fulfilment of these designs.

Let us reflect a little on the state of many of our fellow-creatures, who have scarcely clothes to cover them. Alas ! how many are there around us, who are but half clothed ; and in these severe winter days, can scarcely shelter themselves from the cold ! Let the sight of these miserable people cause us to have a lively sense of the Divine goodness, which has enabled us to provide ourselves with the necessary clothing. As many of those who may read this

paper, may have clothing in abundance; let them remember, that there are many very near them who can scarcely provide themselves a single coat! Be unfeignedly thankful to God for the abundance he has given you.

How should we bless our Preserver for the benefits, which, in this respect, we have received from his hands? How many suits have we received, how many worn, and how many cast off, from our infant state, until now! In this also, how has God united the useful with the necessary, and the pleasing with the useful! Let us return him thanks for his goodness: and beseech him so to instruct our hearts, that our clothing shall never render us guilty of pride and vanity; that we may delight to clothe the poor, and learn how to unite kindness to humility, and avoid superfluities. Let us learn to get our souls adorned with holiness, seeing this alone, in the sight of the Lord, is of great price. By and by, a shroud shall be our last covering.—May God grant, that at that time we may be found clothed with salvation, that an abundant entrance may be ministered unto us into the everlasting kingdom of our God and his Christ.

“Yes, O Father, thou wilt provide! Thou well knowest the necessities of thy children. I will trust in thy goodness, O thou, who powerfully supportest the weak; my hope, O Lord, is all in thee. Let my faith be increased, and my love perfected, day by day!”

DECEMBER XII.

THE CLOTHING OF ANIMALS.

IT is a wonderful proof of Divine Providence, that all animals should be naturally provided with coverings, the best suited to their several habitations and manner of life. Some are covered with *hair*; others with *feathers*; some with *scales*; and others with *shells*. This variety is a sure proof, that a wise Artist has prepared the clothing of animals; as it is not only adapted, in general, to the different kinds, but appropriated also to each individual. *Hair* is the most convenient clothing for quadrupeds. Nature, in giving it to them, has so formed the texture of their skin, that they can, without inconvenience, lie on the earth in all kinds of weather, and be employed in the service of man. The thick *fur* of some animals not only preserves them from wet and cold, but serves also to cover their young, and provide them with a soft bed. For *fowls*, and certain insects, *feathers* are the most convenient covering: for they not only protect them from cold and wet, but are so disposed as to support them in the air. On this account they are spread over the whole body, and their delicate texture is peculiarly favourable to flight. They are light and hollow, and their tubes are fitted with a marrowy substance which strengthens them: and the capillary filaments, interwoven with so much art, render them thick enough to en-

The clothing of animals.

duce the heat of the body, preserve them from the intemperature of the air, and give the wings a proper degree of strength.

The clothing of *reptiles* is perfectly adapted to their manner of life. Observe, for instance, the earthworm. Its body is formed only of a series of little rings, and each ring is provided with a certain number of muscles, by means of which, the body may be greatly extended or contracted. These creatures have a sort of glutinous juice under their skin, which is perspired, and covers the body with a gluey substance, which enables it to slip the better through the earth, which it could not do, were it covered with hair, feathers, or scales.

The substance which covers *aquatic animals*, is not less suited to the element they dwell in. *Fish* could not possibly have more convenient clothing than *scales*; the form, size, substance, number, and situation of which, are perfectly adapted to the peculiar manner of life of these animals. Nor could *shellfish* be better clothed, or better lodged, than they are.

That which is particularly remarkable here is, the beauty of these different coverings. The most deformed beasts, whose appearance is the most disagreeable, have, in this respect, their beauty. But, to the principal part of birds and insects, God has dispensed ornaments with the most liberal profusion. Let us only fix our attention on the *butterfly*; its beauty must excite our surprise and admiration. Many of these animals have but simple clothing, and are all of one colour. Others are sparingly ornamented, and others shine with the greatest variety of the most splendid colours. How greatly has nature diversified the beauty and plumage of birds! The little *colibri*, or *humming-bird*, an inhabitant of America, is one of the wonders of nature; it is not larger than a great fly; but the plumage is so beautiful, that its neck and wings resemble the rainbow. Its neck is of a bright ruby red: under the belly and wings it is as yellow as gold: the thighs are as green as an emerald; and the feet and beak polished, and as black as ebony. The males have a little tuft on their heads, composed of all the colours which adorn the rest of the body. These are worn as pendants in the ears of the women of Mexico.

It is impossible not to be convinced, that God, in creating birds, had their conveniency, utility, and beauty, particularly in view. Every animal has that kind of dress which is most suitable; and it would be imperfect, were it clothed in any other way. There is nothing wanting, and nothing superfluous: every thing is so well arranged, and finished in such a masterly manner, that no human industry or skill can equal it. Does not all this demonstrate the existence of a Being who has all the treasures of wisdom and knowledge, joined with an unbounded goodness; who has determined to render each creature as happy as is consistent with its nature, and the end for which he has formed it?

Thoughts on the ravages of winter.

DECEMBER XIII.

THOUGHTS ON THE RAVAGES OF WINTER.

I HEAR the winds and tempests roar, and my blood freezes in my veins. The gloominess of the day ; its almost extinguished light ; a disposition in myself to terror and dismay ; all concur to render the tumult and disorder which prevail in nature still more dreadful. How often does the wind overturn cottages, and even palaces ; and thus the labour of years is in an instant destroyed. How often have ships, and the unhappy persons who hazarded their lives on the brittle vessel, been precipitated into the yawning abyss ! How often have the sturdy oaks been torn up from the roots !

Yes, thou, O Lord, art the Author and Ruler of the storm : the north wind and the tempest are thy messengers, the heralds of thy power, and ministers of thy will. They should lead us to fear and adore thee. Didst thou not set bounds to their destructive power, they would every where, and at all times, occasion the same devastations. Yet the poor cottage, notwithstanding the violence of the storm, is still preserved ; though unsheltered from the rude blast. Thanks be given to that powerful Being whose voice silences the winds and the waves. His wisdom has ordained all for the best.

“ But, if the world, and all events, are his work, and the effect of an infinite wisdom, how can confusion, desolation, and ruin, occasioned by tempests, be permitted to take place ? Can perfect wisdom produce any thing but order ? And can perfect goodness design any end, but what is good ? ” Thus thou inquirest, O man : but what art thou, to dispute with God ? Shall the creature say to his Creator, Why hast thou made me *thus* ? But does it follow, because we cannot comprehend and explain every thing, that there are any defects in the works of the Lord ? To be able to judge of his works and the ends he has proposed, we must be equal to him in wisdom and understanding. It is indeed a real miracle that we are capable of perceiving even a little of the order which he has established ; of comprehending a part of the wise and extensive plan which he has executed ; and, considering the darkness of our understanding, it is astonishing that things do not appear still more confusedly to us. Alas ! all would be disorder and confusion ; order, harmony, and happiness, could not exist in the universe, were there not a Being whose wisdom, goodness, and power, infinitely surpassed our conceptions ; a Being, who has created the world and all that it contains. All the light, goodness, and felicity which are found in the world, prove the wisdom and goodness of our Creator. And as the general arrangement, and ordinary course of nature, visibly tend only to the good of the creatures ; whatever particular accidents may appear contradictory to this design, they prove only our ignorance, and the limited state of our understanding. To make *one whole*,

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out of all the materials of which the visible world is composed, where so many magnificent phenomena are produced; where the various beauties and treasures of light, virtue, and felicity, are displayed before our eyes, is a work so marvellous and divine, that none but a being of infinite wisdom, power, and goodness, could have conceived the idea, or executed the plan.

The more we advance in our researches in nature's works, the more clearly we discern that wisdom and goodness which have created, and which govern the whole. After having laid down these principles, we shall think differently from what we have done of the ravages of winter. Even the tempest, the snow, the frost, and all that appears disagreeable at this season, are linked together in the eternal order of things. Each thing has its season, and comes at the determined time; and by means of all these revolutions, the Divine wisdom preserves the harmony of the immense whole. The wind which terrifies the mariner at sea, carries water to dry barren land. The sulphureous vapours, salts, and other matters, driven by the wind from one country to another, revive the earth, and restore fertility to the fields covered with stubble, which frequent crops had exhausted. Thus, the winter, which appears so destructive, enables our fields to produce new crops.

At present, the ground, the gardens, and the seeds rest, buried under the snow and ice. The inhabitants of the forests howl more hideously than usual. The beasts are oppressed with hunger. The whole world appears dead. But, the Lord preserves the world, under this apparent death, and watches our perishing nature. What miracles are wrought in the midst of these terrifying scenes of winter! He feeds and supports the poor; the sparrow, which can now no longer find food, lives, notwithstanding, in the place of its retreat, on the gifts of God's beneficent hand. The earth, whose fruitful bosom is now shut up, provides no more food; but, His hand, which is ever open, provides the necessaries of life, and he calls into being the things which do not as yet exist.

"Lord, thou art great! In the most tempestuous seasons thou showest thyself the mild and compassionate Lord. Thou knowest how to prepare us food from snow and ice: and to enable man to shake off the yoke of pinching cold, thou endowest him with understanding and industry. Thou clothest the naked; thou strengthenest the weak; they live and are prosperous. Teach us to seek thy face, and ever to acknowledge thee as the friend and benefactor of mankind. May thy goodness kindle a holy love in our hearts; such a love as feels no difficulty to extend itself to our most cruel enemy; so that we may clothe him when naked, feed him when hungry, and dry up his tears in the day of his distress! It is right that the world should be ever governed by the eternal laws which thou hast prescribed. When, for thy sake, the poor man shares his morsel with him who is utterly destitute, condescend to compensate his labour of

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love. Thy purpose is everlasting. While time shall endure, summer and winter, seed-time and harvest, shall succeed each other, and thy blessing shall rest on the whole creation."

DECEMBER XIII.*

THE ORANG-OUTANG.

THE great interval which separates man from the quadrupeds, is filled up by the *ape*, and by those animals which bear the nearest resemblance to the *ape*, the species of which are very numerous, and intimately blended. Leaving those which approach nearest to quadrupeds, properly such, we insensibly arise, by a variety of gradations, to a principal and superior species, which has so near a resemblance to the human race, that, from this circumstance, it has received the name of *orang-outang*, or *wild man*.

If the elephant appear to resemble man by *intelligence*; the *orang-outang* bears a nearer resemblance to him, not only in his *external* and *internal structure*, but also in his inclinations and habits, and the various talents which result from them.

The *orang-outang* resembles the human being so much, that the anatomist who compares them, seems to compare two individuals of the same *species*, or, at least, of the same *genus*; so that, struck with the numerous and decisive similitudes which he discovers between these two beings, he does not hesitate a moment to place the *orang-outang* immediately after the *Hottentot*.

This animal, the chief and largest of the *ape* kind, appears, in effect, to possess all the attributes of humanity, if we except only that grand and most distinguishing characteristic of man, which no other animal shares with him, and which gives him a decided superiority over all, *reason* and *speech*. The *orang-outang* does not *speak*; therefore he does not think, for speech is necessary to thought. He has, notwithstanding, all the exterior organs of speech; and, on dissection, his brain appears perfectly to resemble that of man: yet something in the number, figure, or arrangement of the particles of matter in the brain, which corresponds to the *human voice*, must be wanting. This animal has not the capacity of connecting his ideas with those articulate sounds which represent them: nor of associating or combining them in that infinitely diversified manner which is so evident in man. But though the *orang-outang* be not man, yet he is, at least, the most perfect similitude of man on the face of the earth. Indeed this similitude is so complete, that the female has the same periodical evacuation as the female of the human species. The male is sometimes as tall, and rather lustier than man. Like him, he walks upright, using a staff for the purpose, which he procures for himself: and which he can use well, either in case of self-defence, or in attacking

The orang-outang.

his enemy. With astonishment, we behold him taking his place at table among the guests, unfolding his napkin, and using his knife, fork, and spoon, in the most proper manner. He pours out the liquor into the glass ; touches glasses with any of the company when desired ; wipes his lips with the napkin ; lays the cup and saucer on the table, puts in the sugar, pours out the tea, and then leaves it to cool before he attempts to drink it. Finally, shakes hands with the guests, or walks out gravely along with them.

We are not less surprised to see the *orang-outang* lie down in the bed, which himself has previously made : place his head upon the bolster ; bind it with a handkerchief : adjust the clothes on him, &c. One who in sickness had been twice bled in the arm ; when afterward afflicted, presented his arm as if desirous of being relieved by the same treatment.

Very susceptible of instruction, the *orang-outang* makes a good servant, and will readily obey either signs or words. If brought up to domestic service, he acquits himself with great propriety and exactness in the different functions assigned to him : rinses the glasses ; brings drink ; turns the spit ; pounds in a mortar whatever is given him to pound ; goes to the well for water, fills his pitcher, places it on his head, brings it home, &c.

These animals live in society in the woods : they have both strength and courage sufficient to attack an elephant with their clubs, and compel him to retreat. They even dare to attack an armed man. More industrious than the elephant, they understand how to build huts with interwoven branches, properly adapted to their necessities ; are passionately fond of women ; pursue them with vehemence, embrace them when they catch them ; feed, and take the utmost care of them.

The female is affectionately attached to her young : carries it in her arms ; gives it the breast, provides for all its necessities, and defends it with great courage.

I almost scruple to insert here a last trait of the instinct of the *orang-outang*, which at first view might appear more proper for *fable* than history ; but which we have received from a celebrated traveller, and with which the great historian of nature has not disdained to enrich his work. When the *orang-outang* finds no more fruits on the mountains, or in the woods, he goes to the sea-coast in search of a very large species of oyster, of several pounds weight, which he often finds *gaping* on the shore ; but the circumspect animal, fearing lest the oyster, in closing his shell, should catch hold of his hand, very adroitly puts in a stone, which hindering the shell from closing, permits him to take out, and eat the fish at his ease !

How manifold and beneficent is the wisdom of God ! What an endless diversity in the works of his hands ! Nature never proceeds by leaps : what an enormous distance separates the man from the dog ! and yet between the man and dog the links of the chain are uninterrupted. In proceeding along this chain, the contemplator of nature

The ourang-outang.

arrives at last, with astonishment, at a being so similar to *man*, that the characteristics which distinguish them, seem less to be specific differences, than simple varieties! Reader, God has distinguished thee from the animal in question, by reason and speech: he has also given thee an immortal soul; he has made thee lord of this lower world; and rendered thee capable of infinite happiness; submit to him who is Lord of the universe; and devote all thy powers unreservedly to his glory!

DECEMBER XIV.

SAGACITY OF ANIMALS IN PROCURING THEIR WINTER'S SUBSISTENCE.

THERE are some animals which lay up stores for winter; and, in harvest time, make provision for six months. It seems as if they foresaw a season when they could not collect food; and make use of this precaution for their future support: besides, they can calculate exactly what will be necessary, not only for their own consumption, but also for that of their family. *Bees* are almost the only insects which lay up provisions for winter. They use their wax with astonishing economy, as they know they can collect no more after the season of flowers is over; and have no other resource for their subsistence and the construction of their cells, than the collection which they have already made. Their prudence directs them to collect another sort of matter which they need, to keep the cold out of their hives; this is a glutinous substance, which they collect from flowers and bitter plants, and which they employ in stopping up closely every crevice in their hives. Their economy may be seen even in the smallest matters. They waste nothing; and that which they need not at present, they reserve for the future. Those who have carefully examined them, assure us, that when in winter they uncover their cells to come at the honey, they carry off the wax with which they were closed, and lay it up for future use.

Among quadrupeds, the *hamster* and *field mouse* lay up provision for winter; and in harvest time carry a quantity of grain into their subterraneous dwellings. Among birds, *magpies* and *jays* gather heaps of acorns in autumn, and keep them for winter in hollow trees. As to those animals which sleep during the winter, they make no provision; this to them would be useless. But the others not only provide for the present, but also for the future. Each in the time of abundance provides against the time of want. And it has never been known that the provisions which they then collected were insufficient for their winter's maintenance.

These economic cares cannot be considered as the fruit of reflection; as this would be to attribute to them much more intelligence than they really possess. It is probable that they only think of the

present, and of what affects their senses, either in an agreeable or disagreeable manner. And, if the present influences them in reference to the future, this is without design, and without their having any knowledge of what they do. How can we suppose that there can be any foresight or reflection in this instinct of animals, seeing they have no experience of the vicissitudes of seasons, and the nature of winter; and that having no idea of the measure of time, it is impossible for them to know when the winter will come, or how long it shall last. Nor can we attribute to them any reasoning or ideas concerning the future; nor imagine that they seek the means for subsistence during the severe season from reflection, seeing they ever act the same way, without any variation; and that each species follows, constantly and naturally, the same method, without having been previously taught it.

When, for example, the working bees continue to collect that honey and wax with which they fill their hives, as long as the season will permit them, it is not because they foresee that a time will come in which they shall not be able to collect any; such foresight cannot be attributed to them: how can creatures which have only sensual perceptions, judge of futurity? But every thing has been so ordered that the bees find provision made, notwithstanding they made the collection without design. They are led by Providence to gather wax and honey; they labour at this during the fine weather, and when winter comes, they find their magazines full. These animals, as well as all others, act blindly and almost mechanically, without reflection or design; although they appear to conduct themselves according to the wisest and most prudential rules. Therefore, being destitute of reason, this wise economy, these acts of apparent foresight and reflection which we remark in them, must be produced by a Superior Intelligence, who has thought of and cares for them; and whose views they fulfil without knowing it.

In this consists part of our superiority over the brute creation. We can present the past and the future to our minds; we can act from reflection, and form plans; we can determine through motives, and choose what is most suitable. But how necessary is it that we should make a proper use of these prerogatives! Informed, as we are, of the great revolutions which await us; and being enabled to look forward to the winter of our life; should we not lay up a good store of well-founded hopes and consolations, which might render our latter days not only supportable but happy? No sight can be more afflicting than to see an old man, who, in the days of his youth, had lived without care or foresight; and who, now that his winter is come, is destitute of all comfort; and whose state is more humiliating because he has deserved it. Let us not act in this inconsiderate manner; but henceforth, after the example of a wise economist, let us ever have the future before our eyes, and prepare for it. Let us, without delay, adopt those measures which may secure our comfort in old age, and our happiness to eternity.

DECEMBER XV.

THE ADVANTAGES OF WINTER.

LET us reflect on the blessings which God grants us in this rigorous season. The cold and frost retain many noxious vapours in the upper regions of the atmosphere, and purify the air. Far from being injurious to the health of men, they often confirm it, and preserve our humours from that putrefaction which continual heat would infallibly produce. If the exhalations and vapours which collect in the atmosphere were always to fall down in rain, the earth would be too much soaked and softened; the roads would be impassable; our bodies would be filled with humours; their different parts would be too much dilated and relaxed; whereas the cold braces and strengthens them, and promotes the circulation of the blood. In very hot countries, and in those where the earth is too wet during the winter, obstinate and mortal diseases are more frequent than elsewhere. Travellers assure us, that in *Greenland*, where the country is covered with mountains of ice, and where, during the winter, the days are but four or five hours long; the atmosphere is very wholesome, pure, and light: and, excepting some slight coughs and affections of the eyes, occasioned partly by the quality of their food, maladies common in Europe are seldom to be met with among them. It is certain that the constitution of the human body varies according to the difference of climates; so that the inhabitants of the northern countries have a constitution adapted to the excessive cold which continually prevails there, and their bodies are generally healthy and robust. Even as man, though the love of activity and labour be necessary for him, is nevertheless glad to suspend his labours every evening, that he may taste the sweets of repose, and spend a part of his time different from that in which he was during the day; even so our nature accommodates itself to the variations of the seasons; and is pleased with this variation, because it contributes to our comfort and well-being.

At present, our gardens and fields are covered with snow; and they repose under this covering: and it is necessary to preserve them from the injuries of the cold, to shelter the seed from the impetuosity of the winds, and to prevent it from rotting. Our fields had need of rest after having produced, during the fine weather, an abundance of all those fruits on which we subsist during the winter. In this let us acknowledge the wise bounty of God: if our present support had not been provided for us: if in this severe season we were obliged to till the earth, our complaints would have some ground; but he has replenished our stores with a sufficiency for our present necessities; and we enjoy that rest which is suitable to the season.

How tenderly does Providence care for us in these days of winter! God has endued men with that industry which they require, to defend themselves from the cold and frost. Their inventive minds

Advantages of winter.

have led them to find out an artificial fire, by means of which they may enjoy, in their chambers, some of the comforts of summer. The care of Providence is not less manifest in the yearly produce of wood, and its astonishing increase, than in the fertility of our fields. Besides, we have at this season a multitude of creatures at our command, which make it tolerable. The colder the country is, the more those useful animals are multiplied in it whose fur is designed to keep us warm. Is it not evident, that the Divine Wisdom has foreseen the wants of different countries; and that he has provided for them by placing animals there, which could live no where else! Our beasts of burden bring us the necessary provision: and it is worthy of remark, that our cattle are most prolific when we stand most in need of them.

Winter does not materially interrupt trade or commerce. Rivers, in many places, are frozen over, and are as solid as brass; the surface being covered with snow, travelling is facilitated; and thus a new mean of intercourse is opened among men. Men are not condemned to inaction, or idleness, during this season; for, if they are obliged to suspend the labours of the field, they have a thousand ways of employing themselves usefully in domestic life. The repose of nature invites them to reflect on themselves. Their attention, it is true, can be no longer fixed on the beauties which spring and summer present to their eyes; but their minds may be so much the more at liberty to reflect, even in the darkness of the night, on the instability of all earthly things: and these reflections may lead man to consecrate himself unreservedly to the service of that Supreme Being, who never changes, and to prepare for eternity. Man may now have leisure, in a quiet retreat, to cultivate his understanding; study his own heart; correct his errors; and acquire power from his Maker to walk uprightly. How wise should we be, if we made so good a use of this season! If, during the winter, we can neither cultivate our gardens, reap our fields, nor gather in new fruits; we may, at least cultivate our souls, and endeavour to render ourselves useful to our neighbour. However severe the season may be, it may, nevertheless, furnish us with abundant reason to bless God; to acknowledge his benefits, and trust in him.

How inexcusable must our ingratitude be, if wholly taken up with the inconveniencies of winter, we forget the advantages and blessings which God condescends to give us in this season! Let these considerations awaken our minds to more equitable sentiments, and excite us to celebrate the loving kindness of the Lord at all times, and in all seasons.

DECEMBER XVI.

THE ELEMENTS.

WHETHER we consider the universe collectively, or examine its different component parts, we shall always find sufficient motives to lead us to admire the power and wisdom of the Creator. It is true, that we know things very imperfectly ; and that, in most cases, we can scarcely go beyond conjecture and probability : but this is enough to cause us to acknowledge the greatness of God on the one hand, and the weakness of our reason on the other. Probably all the elements are of the same nature, and may be reduced to one only : perhaps they are so combined, as to form but one whole. But it would be very difficult to consider the elements in this collective point of view : it is therefore necessary to divide them in our minds, and consider the primitive constituent parts of bodies separately.

What various and admirable properties has the *air* which we every moment respire ! With what force does it divide and dissolve all sorts of substances, partaking of the qualities of each ! Innumerable vapours and exhalations, and thousands of different odours : so many volatile salts, alkalies, and acids : so many oils and inflammable spirits, which blend and unite with it, render it sometimes noxious : but, in general, wholesome and good. These foreign matters with which the air is laden, its elasticity, the property it has of being rarefied or condensed, and of reassuming its natural state, produce those agitations in the atmosphere, those meteors, which disperse noxious vapours, which purify the earth, and promote the vegetation of plants. And though the effects of the air may be sometimes terrible, they are nevertheless absolutely necessary to prevent the earth from becoming a frightful desert. But there are in this element, as well as in all the works of the Lord, impenetrable mysteries. Who, for instance, can explain how the particles of air, which are so extremely fine as not to be visible, are, notwithstanding, the very means, by which objects become visible to us ! What can be more astonishing than that equilibrium between the outward air and that which is within us ? A balance on which our very life depends ! And who can sufficiently admire this, that one and the same element should be the medium by which sounds, odours, and light should be transmitted !

There is great conformity between *air* and *water* ; and its properties and effects are not less various, nor less wonderful. How many different qualities has God given to this element ! All the abundance and salubrity of the air, all the fertility of the earth, and the warmth of the fire, could not save us from perishing, were we destitute of water. How many changes is it susceptible of ! Who has given it the property of being dilated, divided, and rarefied, so that it can ascend the height of a league in the atmosphere, form itself into fogs and clouds, and continue suspended there ? Who has given it power

The elements.

to penetrate plants, to transpire from them through insensible pores ; and diffuse itself over our fields and valleys in the form of a refreshing dew ? How astonishing is that property which it has of becoming sometimes lighter than air ; (although a mass of water be nearly 900 times heavier than a similar mass of air ;) of resuming afterward its natural weight ; of attaching itself to all sorts of bodies ; of dissolving the most compact substances, and of uniting itself even with fire !

Of all the elements, we know least of *fire* : it is too subtile for our eyes : but its virtues, properties, and effects, are sensible enough. Whether the essence of fire consists in *motion* only, or in the formation of what are called inflammable particles ; or, that it is a simple substance, different in its nature from all other corporeal things, (which a number of experiments seem to render very probable,) it is, nevertheless, certain, that its prodigious abundance, its utility, and its wonderful effects, deserve our utmost attention. There is no body, however cold, but contains fiery particles, which become sensible when excited by violent friction. Fire exists every where. Its presence is universal : it is found in the air we breathe, in the water we drink, and in the earth that supports us. It enters into the composition of all bodies : it pervades their smallest pores ; it unites itself intimately with them : it moves with them from place to place : and, however enveloped, however confined, it fails not to make itself evident at last. With what force does it dilate the surrounding air ; whilst the air, in its turn, nourishes the fire, and renders it more active and violent. Fire gives water its fluidity, the earth its fertility, health to man, and life to all animals.

Earth, when in a pure state, is distinguished from all other substances, by having neither *taste* nor *smell* : by being insoluble both in water and spirits of wine, and in being most friable of all bodies. At first sight, it appears very different from all the other elements ; nevertheless, it has so many conformities to them, that there are philosophers who believe that water is nothing but earth saturated and dissolved ; and the earth is water thickened and condensed. According to these, the water continually diminishes on our globe, and gradually forms compact bodies : because, that formerly our planet was only a wet and fluid mass, and was, in more ancient times, nothing but water.

All the elements which we have mentioned, are absolutely necessary to our existence and preservation : and there is none of them but may fill us with admiration, when we reflect on its wonderful properties, and on the numerous and diversified effects which it produces. With how many properties, different from each other, has God endued his works ? How many agents, in heaven and on earth, are continually employed for the preservation of the universe in general, and of each creature in particular ! How many revolutions and phenomena are produced by the mere combination of the elements ! It would be more easy to reckon up the works of God, than

the multiplied forces which are still in action. But, how great must that Power be, from which all these proceed! They all depend on the will of the wise and almighty Creator. He has formed the whole: and impressed on each its constant, uniform, and beneficial motion. It is God who maintains the elements in that equilibrium to which the world owes its preservation! And to this God be glory for ever and ever!

DECEMBER XVII.

THE SUN'S INFLUENCE ON THE EARTH.

THE sun is the principal cause of most of the phenomena which take place on the earth. He is the constant source of that light which is so plentifully diffused over our globe. The light of the sun is the most subtile fire; it penetrates all bodies; and, when in sufficient quantity, it puts all their parts into motion; attenuates, decomposes, and dissolves those that are solid; rarefies those that are fluid, and thus adapts them to an infinity of motions. Is it not evident, that on these various operations of the sun on bodies, all the phenomena, and all the revolutions of the globe depend, even in the smallest circumstances. When the strength of the sun's light increases, i. e. when his rays fall less obliquely on us, and in a greater quantity on a given space, and that they continue longer each day, as is the case in summer; all this must necessarily produce the most considerable changes, not only in the atmosphere, but also on the surface of the earth. And when the rays fall more obliquely on a given space, and are consequently weaker, and in less quantity! and the days being shorter, their action is not prolonged, as is the case in winter. What a change takes place in the earth, and what different phenomena do we observe in the atmosphere; what gradual changes do we perceive, when, from the remote sign of Capricorn, the sun continues to approach the equinoctial line; till in spring, the days and nights become equal! And, how many new phenomena appear, when this luminous and active globe returns in summer from the tropic of Cancer towards the line, till the days and nights become again equal in autumn, and the sun removes from our zenith!

It is on the distance of this luminary that all the variations depend which we observe in the vegetation of plants, in the internal constitution of bodies in all climates, and in all seasons. Hence each climate, and each season, has plants and animals peculiar to itself: hence the progress of vegetation is more or less rapid, and the productions of nature subsist a longer or shorter space of time. But it would be impossible to describe the various effects of the sun on the earth. All the changes and revolutions which take place on our globe, have their principle in the influence of the sun; for, on him, principally, the different degrees of heat and cold depend: I say,

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principally, for the nature of the soil, the different combinations which exist in one country more than in another, mountains of a greater or less height, and their different position, may also contribute something towards a country's being more or less cold, and more or less subject to rain, to wind, and to the other variations of the atmosphere. But, it is incontestable, that these accessary causes are not sufficient to produce the effects which we observe in different places, and in different times : for these effects could not exist, if the heat of the sun did not act in the manner it does. And were the degrees and manner of its operation changed, the effects, also, would change in the same proportion.

It requires but very little attention to be convinced of the numerous and sensible effects of which the sun is the prime cause : his influence appears daily. Sometimes he rarefies, and sometimes condenses the air : sometimes he raises vapours and fogs : and sometimes condenses them in order to form them into meteors, or send them down in rain. It is the sun which causes the sap to ascend in vegetables ; which causes the leaves and blossoms to shoot ; which produces, tinges, and ripens the fruit. The sun animates all nature. It is the source of that vivifying warmth, which gives to organized bodies the power of unfolding themselves, and of growing to perfection. It penetrates into the depths of the earth, where it produces metals, and gives life to animals. It penetrates mountains and rocks, and its influence reaches even to the depths of the sea. This alone must be sufficient to convince us of the power of our Creator : but if we consider with how much art God has drawn a multitude of great effects out of one and the same instrument, and has caused the heat of the sun to produce so many phenomena in nature, we shall be more and more sensibly persuaded that nothing less than infinite wisdom, joined to unlimited power, could have produced so many miracles. Would men deserve to be enlightened, warmed, and cheered by the sun, if, in the salutary influences of this beneficent globe, they did not acknowledge the glorious perfections of the Supreme Being : if they did not admire his greatness and goodness ; and if they did not adore him with sentiments of the most profound veneration and respect ?

DECEMBER XVIII.

TEMPESTUOUS WINTER RAINS.

HOW different are these cold rains which fall at present, from the warm showers which in summer embellished and fertilized the earth ! This change gives a melancholy aspect to nature. The sun is veiled, and the whole sky appears to be but one immense cloud. We cannot see to any great distance : a gloomy obscurity surrounds us : and the tempest is continually lowering. At last, the clouds empty

Tempestuous winter rains.

themselves and deluge the fields ; the atmosphere seems an inexhaustible reservoir for water : rivers and brooks are swelled up, overflow their banks, and lay fields and meadows under water.

However disagreeable and inconvenient this weather may appear to us, we must acknowledge it is for wise and kind purposes. The earth, in a manner exhausted by its fruitfulness, requires a renovation of its strength : and in order to this it is not only necessary that it should rest, but that it should be also sufficiently moistened. The rain waters and revives the dry thirsty land. The wet soaks into it, and reaches down to the lowest roots of plants. The dry leaves which covered the earth, rot, and become excellent manure. The heavy winter rains fill the rivers anew, and furnish water for springs and fountains. Nature is never idle. It continues to labour, though its activity be sometimes concealed. The clouds, by continually pouring down rain or snow, prepare for the fertility of the coming year, and for the riches of summer. And, when the heat of the sun restores the dry season, the abundant springs, which the winter rains had formed, diffuse their waters abroad, refresh the fields and valleys, and adorn them with fresh verdure. Thus the wise Creator prepares for the future ; and that which appears to us inconvenient, and even destructive, is, in his hand, the germ of the beauties and abundance which are lavished on us in spring and summer. The blessings which God grants us by these means are as innumerable as the drops which fall from the clouds ; and though blind and ungrateful man continue to murmur when he should rejoice and adore, yet the eternal and unchangeable Wisdom continues to fulfil his beneficent designs. Our preservation, therefore, is the chief end which God proposes in watering the earth with these rains. But the Divine wisdom knows how to combine various designs subordinate to each other ; and from the happy combination of these designs, the order and good of the universe result. Thus, animals which exist, not only for the use of man but for themselves, must also be fed and supported ; for them, as well as for us, the rains descend from the clouds and render the earth fruitful.

But here, as in all other things, we see the wisest economy. All the vapours and exhalations which daily arise from terrestrial bodies, are collected and suspended in the atmosphere ; which in due time restores them to the earth, either in the form of small drops, of heavy showers, or in flakes of snow, according to its different necessities ; but this is always done with economy, and without suffering liberality to degenerate into prodigality. Every thing becomes serviceable : dews which are always imperceptible to us, light fogs and mists, all contribute to fertilize the earth. But in vain would the vapours arise, in vain would the clouds be formed, if nature had not provided the winds to shake and disperse them on all hands : to convey them from one place to another, to water the ground where it requires it. Were not this the case some districts would be deluged with perpetual rains, and others would experience all the horrors of

 Tempestuous winter rains.

drought: trees, plants, grass, and corn, must perish, if the winds did not drive away the clouds, and mark out the places on which they were to pour out their rains. *God says to the snow, Be thou upon the earth;* and it descends in flakes: and when he commands the winter's rain to fall, it spreads itself over the face of the field.

However inconvenient the rains of winter may appear, or the uncomfortable temperature of this season, they are, nevertheless, absolutely indispensable: so also are the dark and gloomy days of our lives. In order that we may bring forth all the fruit of good works, it is not necessary that the sun of prosperity should shine uninterruptedly upon us; we must meet with trials and afflictions. Let us receive adversity from the hand of God with resignation; as we may be fully convinced that all his dispensations are ordered by infinite wisdom and goodness.

 DECEMBER XIX.

JUDICIAL ASTROLOGY.

THE prodigious distance of the heavenly bodies from our globe, and the little connexion they have with it, will not permit us to believe that they can have any sensible influence upon it. Nevertheless many superstitious people give credit to such influence; and say that continual emanations proceed from the stars and planets, which operate not only on the atmosphere, but on all terrestrial bodies. But what are these emanations? If by these they mean the proper light of the stars, or the light of the sun reflected from the planets, it comes evidently to very little, as it is much less than what comes to us from the moon alone. But as the light of the moon has no manner of influence upon the earth or the atmosphere, consequently the much feebler light of the planets and stars can have none. But if it be supposed that other matter emanates from the stars, this supposition is not only void of all foundation, but is evidently false: for if there were real emanations, they must, when collected in the focus of a burning-glass, produce some alteration and some sensible change in terrestrial bodies; but this is contradicted by experience. It therefore follows that no other matter proceeds from these heavenly bodies, than that faint light which they send to us; or, if any other emanations proceed from them, they must be such as pass through terrestrial bodies without producing the smallest derangement in their parts. Thus the astrologers, whether they deceive themselves, or wish to impose upon others, deserve nothing but contempt when they inform us of the benign influence of *Jupiter*, the malignant influence of *Saturn*, the wit-inspiring influence of *Mercury*, the warlike disposition produced by *Mars*, and the amorous influence of *Venus*.

Judicial astrology.

The planets not only cannot produce any of those particular effects which the astrologers attribute to them ; but taken even collectively, they have no influence. But what shall we say of the rain-bringing *Pleiades*, the tempestuous *Orion*, the melancholy *Hyades*, the setting of *Arcturus*, and the rising of *Capricorn* ; all of which presage hail and tempests ? What influence can the constellation *Taurus* have on pease, beans, and such like ; or the star *Sirius* on mad dogs ? What relation can *Scorpio* have with the productions of harvest ? But if the rising and setting of the different constellations were observed only in order to know the proper times for the different operations of agriculture, and not as the causes of natural things, this might be pardoned. In ancient times the beginning, middle, and end of each season were not marked by months ; but by the rising and setting of stars in conjunction with the sun, or by immersion in, and emersion from, the rays of that luminary. Hence the vulgar opinion, that the different aspects of these stars produce the effects which, in reality, can only be attributed to the seasons, and consequently to the sun. *Orion* rises in autumn, and sets in winter ; this has made some people think that he is the author of tempests ; but it is not he who raises them, it is the autumn and winter ; and his rising and setting only marks the time of those seasons. When the *dog-star* rises with our sun, it is excessively hot in our zone ; but this star is not the cause of it ; the heat comes from our sun, who is then in his greatest elevation. I say *our sun*, for in the opposite zone, when the *dog-star* rises with the sun, it is so very cold as to benumb animals, and cover the rivers with ice. Therefore the inhabitants of the southern countries, far from considering the *dog-star* as the cause of heat, consider it as the cause of cold. It is exactly the same with the *Pleiades*, which are supposed to be the cause of rain ; and it is the same with all the other constellations, to which effects have been attributed which, in reality, belong only to the seasons when these stars rise and set.

If then the *planets* and *fixed stars* have no part in the temperature and natural revolutions of our globe, they can have no influence over human actions. The happiness and misery of individuals, and of whole nations, depend partly on their natural talents and passions ; and partly on the political constitution of those states ; and partly on the union of certain circumstances, natural and moral ; but in all these the stars have no influence ; and had they any, we should be led to doubt the empire of Providence ; and to believe that the world was not governed by an infinitely wise, just, good, and powerful Being. And, who would wish to inhabit a globe, the revolutions of which depend on blind chance, or the influence of the stars, which must be fatal to our natural and moral state.

Let us, therefore, leave to the superstitious a science inimical to our repose, and so degrading to the human mind : and let us ever understand *astrology* to be only, at the bottom, a miserable perversion of *astronomy*. It is a sufficient foundation for our peace that we live under the empire of a wise, just, and gracious Parent, who is the sole

Judicial astrology.

Arbiter of our lot, who directs all the events of our life : and who is the Governor, Preserver, and Regulator of the sun, the moon, the planets, and the stars !

DECEMBER XX.

THE POLAR STAR.

AMONG the northern constellations, there is none so remarkable as that which is nearest to the pole, and which is termed the *little bear*. The last star of its tail is but two degrees distant from the pole : on this account it is called the *polar star*. It is easy to distinguish this from the stars near it, because it scarcely appears to change its position ; and is always seen in the same point of the heavens. It appears indeed to revolve round the pole ; but its motion is so slow, and the circle which it describes so small, that it is scarcely perceptible. Its situation, therefore, can be very little varied : and, as it is seen in all seasons of the year in the same point of the firmament, it becomes a sure guide to the mariner, particularly in the open seas. Before the discovery of the magnet, sailors had no surer guide than the *polar star* ; and even now, when the sky is serene, they may depend more confidently on this star than even on the *magnetic needle*.

The advantages which we derive from the *polar star*, may naturally lead us to useful reflections. What a sure moral guide is that inestimable gift of God, viz : his WORD ; and especially his GOSPEL, which shows us the course we should steer through the stormy sea of this world ; and through the darkness with which we are encompassed. Without this faithful guide, we should wander continually, and never find the path which leads to God and heavenly glory. If this divine word were not as a *lamp* to go before us ; and a light which points out the path we should take, we should be liable to err here below ; sometimes tormented with fear, at other times entertaining some feeble hope ; but always in doubt and uncertainty. It is in divine *Revelation* alone that we find a *sure* and *invariable rule*, according to which we may pursue the race that is set before us with courage, and finish it with joy. Let us ever follow this sure guide, which cannot lead us astray. Let us attend to it as the pilot attends to the *pole star* ; and let us keep it continually in sight, that we may not err. With its assistance we shall shun all dangers ; be preserved from shipwreck ; and at last arrive in that blessed haven, where we shall rest from our labours ; and where we shall enjoy a happiness which nothing can disturb.

What we have said concerning the *polar star*, should lead us to admire the goodness of God ; who, by the situation and course of the stars, gives us a sure knowledge of times, places, and the different points of the heavens. An astronomer, though in an unknown coun-

The polar star.

try, can, by means of the stars, tell where he is ; and know the month, day, and hour, as exactly as if he consulted the most correct time-piece. If, for instance, we only take notice that the stars come every day *four minutes* sooner to the place where they were the preceding evening ; we know, consequently, that this will amount to *two hours* in a month. Thus, the star which we noticed this evening in a certain point of the heavens at *ten o'clock*, we shall see, if we are on the same spot the twentieth of January, in the same point of the heavens precisely at eight o'clock. The star which we observe this day at midnight exactly over our heads, will, in the space of a year, come to the same point again. In this we may see the tender concern of God for all the inhabitants of the earth. How much to be pitied would many people be, who have neither clocks, watches, nor geographical charts, if they could not supply this defect by the observation of the stars ! If we consider ourselves in the place of those people, this meditation will not appear a matter of indifference : for, we must be devoid of every human and generous sentiment, if objects which do not immediately concern ourselves, but which interest so many of our brethren, should appear unworthy of our attention.

Let us raise our souls in gratitude to our compassionate Father, the Creator of all the heavenly host. The use that the stars are of, in this respect, to man, is certainly one of the smallest advantages which result from the existence of these celestial bodies ; and yet this benefit alone merits our praise and thanksgiving. "The heavens are the work of thy hand ; thou hast marshalled all their hosts. Thou hast extended them widely as a curtain, and made them the ceiling of thy palace. The highest heaven is thy throne, and thou hast hung out the moon and stars to illuminate our nights."

DECEMBER XXI.

EFFECTS OF AIR WHEN CONFINED IN BODIES.

THE effects of air, when enclosed in bodies, are very astonishing. Every body knows what is the consequence of fluids freezing. Water in this state generally breaks the vessels in which it was enclosed. A musket filled with water, if the muzzle be hermetically sealed, bursts with great violence in excessive cold. This, at first view, appears incomprehensible : we know that water is not fluid of itself ; but becomes so by means of the principle of heat, which penetrates every part ; and consequently it becomes a solid mass, when it is deprived of the particles of this matter which were included in it ; or when its fluidity ceases through excessive cold. It seems then that the particles of water must be condensed, and approach each other more closely ; and that thus frozen bodies should occupy less space than they did before. Yet they certainly expand while in a freezing

Effects of air when confined in bodies.

state ; and their size is considerably increased : without which, it would be impossible for vessels containing frozen fluids to burst. Besides, how could ice swim, if it did not increase in bulk, and were not consequently lighter than water ?

But, what can be the cause of this effect ? The *internal air* ; for it is impossible that it could be produced by any *external* cause. It cannot be the *cold* : for this has no real being, nor positive quality ; and, properly speaking, cannot penetrate bodies ; and it is as certain that *heat* is not the cause of this phenomenon. The air cannot insinuate itself into vessels of metal or glass, sealed hermetically ; and yet ice forms within them. We must, therefore, seek the cause in that internal air contained in the water. To be convinced of this, we have only to observe the water as soon as it begins to freeze. Scarcely is the first pellicle of ice formed on it, before the water begins to be agitated, and a number of air bubbles ascend. Often this upper coat of ice rises in the middle and splits, and the watersprings up through the cleft, dashes against the sides of the vessel, and, in running down, freezes. Hence it is, that towards the middle of the surface, the water appears elevated and convex. All this is the effect of the internal air ; an effect that could not take place, or would at least, appear in a much less degree, if the air were exhausted as much as possible from the water before it began to freeze.

On this ground, it is easy to explain a number of very singular phenomena. An intense cold is very injurious to vegetables. We know that the sap circulates in all plants ; which, though it thickens a little in autumn and winter, nevertheless continues fluid. Intense cold converts its fluid into ice, and consequently enlarges its mass ; and this cannot take place without causing many of the fibres and tubes to burst. Now, when this takes place, it is manifest that when the sap becomes rarefied in spring, it cannot circulate properly ; just as the circulation of the blood must be stopped in an animal whose veins are cut. Thus, the growth of the plant is not only injured, but it dies ; because the nutritive juice no longer circulates in its vessels. Let us consider, however, that this very cold, which is so prejudicial to the plants, is useful to the earth. A field, tilled before winter, is better fitted to receive the autumnal rains, which penetrate deeply into it. Frost succeeds ; the earthly particles become dilated, and separate from each other : and the thaw in spring completes the softening of the earth, rendering it light, moveable, and better adapted to receive the genial influences of the sun in fine weather.

Enough has been said to convince us of the power of the air ; and of that expansive force which is productive of so many advantages to our globe. The property this element has of condensing and rarefying so wonderfully, is the cause of the greatest revolutions in the world. It is but in a very few cases that the power of this fluid can become injurious : and even then the evil that it does, is compensated with vastly superior advantages. But we must acknowledge, that in this, as well as in a multitude of other phenomena of nature, there

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are many things which we cannot satisfactorily explain. What we know of the nature, properties, and effects of air, depends much on probable conjectures : which may be illustrated and verified in future times. Probably, those who may immediately follow us will discover, that on many points we have formed false and precipitate judgments. How careful should we therefore be, that when we contemplate the works of God in nature, we should do it in a spirit of humility and self diffidence ; always remembering the weakness of the human understanding, and the uncertainty of our opinions and systems. Presumption is inexcusable in every science ; but, it is absolutely foolish and ridiculous, when the knowledge of nature is in question.

DECEMBER XXII.

MUSIC.

ONE of the most pure and innocent pleasures which we can enjoy, we owe to music. It possesses the power of charming our ears, soothing our passions, affecting our hearts, and influencing our propensities. How often has music dissipated our gloom, quickened the vital spirits, and ennobled our sentiments ! An art so pleasing and useful well deserves our attention ; and calls upon us to employ it to the glory of our beneficent Creator.

But, whence is the impression which music makes on our ears ? It is an effect of the air, which receives an undulatory motion, and which strikes our auditory nerves in a variety of ways. When a tight cord is pinched, its figure is changed : for, its elasticity not only causes it to go back to its first situation, but to extend beyond it ; and thus it continues to vibrate back and forward, till at last it settles in that state of rest from which it was drawn. These vibrations of the string are communicated to the air : which, in its turn, communicates them to other contiguous bodies. Hence it is, that when an organ is played on, the strings of a lute, if near, will be put in motion, and emit sounds. But, whence is the difference of sounds ; and how is it that they are either *sharp* or *flat* ? This cannot be attributed to the quickness of the vibrations by which the sound is propagated in the air, for a sharp note cannot communicate itself with more velocity than a *flat* one : nor can it be owing to the quantity of air that is put in motion ; for a sound may be either *flat* or *sharp*, and strong or weak, at the same time. The difference must be from the quickness of the air's tremulous motion. A sonorous body emits a sharp tone, when the vibrations of its parts are very quick ; and a flat tone, when these vibrations are slow. But, how is it that certain united sounds are harmonious, and charm the ear ; when others are discordant, and put us to pain ! All that we can say in reply, respecting the physical characteristic of concords is, that they are produced in the same key ;

 Music.

whereas, in discords, though the sounds may be emitted at the same time, yet they do not properly unite and blend together : which, occasioning a double stroke on the auditory nerve, affects the mind in an displeasing manner.

But, of what use would harmony be, if we could not distinguish it from discord ? Let us praise God, who has so disposed the organs of hearing that we can receive and distinguish different impressions of sound ; and has given our souls the faculty of uniting certain ideas to certain corporeal sensations. How much gratitude do we owe to our God, for the many pure and innocent pleasures which he has given us to enjoy ! In this point, let us testify our gratitude, by using music to the glory of his name. Let us lift up our hearts to our great Benefactor, in the most melodious sounds, and celebrate his infinite goodness towards us !

 DECEMBER XXIII.

MEN COMPARED WITH OTHER ANIMALS.

IN the comparison which we are going to make between men and other animals, there will be found some things which are common to both ; others, in which they have the advantage over us ; and lastly, some in which we have the advantage over them.

The principal resemblance between men and brutes is, that both are material. We have, like them, life, and organized bodies, which are produced by generation and birth, and supported by food. Both have animal spirits, and strength to fulfil the different functions assigned them. Both have voluntary motion, the free use of their various members, organs of sense, feeling, imagination, and memory. By means of the senses, both can feel pleasure and pain ; desire some things, and be averse from others. Both feel a natural propensity to self-preservation, and the propagation of their species. Both are liable to those general corporeal accidents, which the connexion and different relation of things, the laws of motion, and the structure and organization of their bodies may occasion.

Relative to that pleasure which may result from the gratification of the senses, animals have many advantages over men. A principal one is, that they do not need so much clothing, instruments of defence, and conveniencies as men : and are not obliged to invent, to learn, and exercise the arts necessary to procure them.

At their birth, they bring into the world clothes, arms, and other necessary things : or, if any thing should be wanting, they have only to follow their natural instinct, which is sufficient to render them happy. That instinct never misleads them ; and whenever their appetites are gratified, they are perfectly content ; they desire nothing farther, and never run into excess. They are satisfied with the present, and take no trouble concerning the future : for, there is much reason to believe, the animals have not the faculty of representing to themselves what may happen. A present sensation informs them of

Men compared with other animals.

their wants ; and their instinct teaches them how to supply them. These means they use with pleasure : they procure them what they wish ; and they enjoy what they get with satisfaction. They never think of the morrow : they know nothing of inquietude concerning the future ; even death itself surprises them, without having been foreseen : and without having been the cause of previous affliction to them.

In all these respects, the brute has the advantage over the man. Man is obliged to meditate, invent, labour, exercise himself, and receive instructions, without which he must remain in a continual state of childhood ; and could scarcely procure himself the necessaries of life. His instincts and passions are not sure guides : on the contrary, if he abandon himself to their direction, he is sure to be miserable. Reason alone makes the essential difference between him and the brute ; supplies what is wanting ; and in other respects gives him prerogatives to which the brute creation can never attain. By means of this faculty, he not only acquires necessaries, conveniencies, and superfluities ; but he can multiply the pleasures of sense, can ennoble and render them still the more gratifying, as he knows how to govern his desires by this faculty. His soul tastes pleasures which are entirely unknown to brutes : pleasures which spring from science, wisdom, order, religion, and virtue : and these pleasures infinitely surpass all those which come through the organs of sense : for, 1st, Far from being contrary to the true perfection of man, they continually increase it. 2dly. They never forsake him ; even when his senses are deadened by sickness, old age, or any other circumstance ; and are become insensible to all animal gratification. 3dly. They cause him more and more to resemble God ; while, on the contrary, the more he gives himself up to the pleasures of sense, the more he is degraded, and the more he resembles the brute. We may add, that the brutes are confined within a narrow sphere ; that their desires and propensities are but few, and consequently their pleasures are not greatly diversified : whereas man has an infinity of desires : can press every thing into his service ; and knows how to make every article useful in one way or other. He can continually add to the perfection of his nature by new discoveries : he acquires farther degrees of knowledge ; and can make unlimited progress in the path of perfection and happiness. But, the beasts are constantly confined within a narrow compass ; neither invent nor perfect any thing ; continue always at the same point ; and never rise by application and exercise above animals of the same species.

We may conclude, that it is reason alone, and its consequences, which give us the superiority over the brute creation ; and in this the chief excellence of human nature consists. To use our reason, to ennoble the pleasures of sense, to relish intellectual delights, to grow continually in wisdom and holiness ; these distinguish man from the brutes : this is the point to which he should ever direct his attention : this is the end for which his Maker formed him. Let it be

our grand business, our constant study, to answer this end : for happy we cannot be, but in proportion as we see what reason and revelation proclaim to be useful and good.

DECEMBER XXIV.

A CALCULATION CONCERNING THE RESURRECTION.

WITH what a crowd of human creatures must a single city be filled, on the great day of the resurrection ! What prodigious multitudes will be spread over the whole earth ! Prodigious indeed, but not innumerable ; seeing each of the dead is known unto the Lord, his Judge, and the name of each entered in the eternal register. None shall be lost ; for all must appear before his judgment-seat, and none can escape the notice of the all-seeing God.

Let us suppose that *Germany* began to be peopled about 500 years after the general deluge ; that is, about 3,650 years ago, and that from the foundation of the city of *Hamburg* at the above time, to the general judgment, suppose it were to take place in the present year, there have only 200 persons been buried annually, taking one year with another ; the number of persons would amount to 730,000 ! If then a single city could produce so many at the day of judgment, how many must the whole German empire produce ! Admitting that *Germany* contains twenty-four millions of people, the city of *Hamburg* could be reckoned only the three thousandth part of the whole. If this be the case, we may suppose, on the preceding calculation, that *Germany* will then produce 2,190 millions ! This is a prodigious number undoubtedly ; and yet what is it in comparison of the produce of the whole earth, the present number of whose inhabitants is estimated at not less than 1000 millions ! If we fix on this number, and apply the same calculation as before, the total of those who have died since the above mentioned time must amount to 912,500 millions ! If we now add those who have lived before the general deluge, and those who have died during the 500 years next following, which we may estimate at one-fourth of the preceding, we shall then have a sum total of 1,740,625 millions ! Lastly, add all those who shall be found alive at the day of judgment, and let us fix the number at no more than 100 millions, and the whole amount will be 1,741,625 millions !

Let us give full scope to our imaginations, and figure to ourselves, as far as possible, that this prodigious multitude shall appear in the last day before the Judge of the universe : how great must that intelligence be, that can scrutinize the most secret thoughts of all the individuals of which this vast multitude is composed ; who knows exactly all their words, thoughts, and actions ; who perfectly remembers the day of their birth, the duration of their life upon earth, with the time, manner, and circumstances of their death : who shall

 Calculation concerning the resurrection.

be able perfectly to distinguish the scattered atoms of each ; separate, collect them, whether their bodies had been reduced to ashes, dissolved into millions of particles, or had undergone innumerable transmutations ! What a work of Omnipotence to collect these scattered atoms, to purify, ennoble them, and form them into immortal bodies !

God has informed us, by Divine Revelation, that hosts of angels shall gather his chosen from the four winds ; that the first sound of the trumpet shall awake the bodies of saints that slept ; for those who die in Christ, shall rise first. (1 Cor. xv. 23.) What a pleasing employment to the ten thousand times ten thousand thousand angels, (Psal. lxxviii. 17.) to collect their well-beloved brethren, and present them to Christ ! And what transporting joy must it be for the myriads of blessed spirits, whom God had gathered into his bosom, to find again those bodies which they had left behind, pale, ghastly, disfigured by sufferings, mutilated by acts of violence, or consumed by fire ; to find them again, I say, clothed with celestial beauty and splendour, like those of the holy angels ; as light, as strong, and as radiant ! Such bodies shall never more be, as they were formerly, hinderances to the spirit ; but shall be, in every respect, adapted to the employment of a state of eternal beatitude. With what transport may we figure to ourselves the surprise and ineffable sensations of the elect at the sight of this miraculous change !

 DECEMBER XXV.

REFLECTIONS ON THE NATIVITY OF CHRIST.

WHAT sentiments of joy, gratitude, and love, should the Christian feel, who, on this day, celebrates the nativity of Christ ! But how great should our surprise be, when we reflect on the circumstances which accompanied this great event ! We see a son of man in the lower state of humiliation ; and this Son of Man is our God ! We behold the strong God, the Invisible, by whose word the heavens and the earth were made, and by whose word they shall be destroyed ; and we see, at the same time, a visible being, weak, and clothed in flesh like our own ! How wonderful is this union ! The King of kings, whom the angels adore, appears in the form of a servant ! He is an infant, weak, destitute, shedding tears, and lying in a manger ! What an astonishing humiliation ! Human nature, so limited and corrupt, raised by Jesus Christ to an eternal throne of glory ! What an astonishing change ! But can we at all comprehend the greatness of the Divine mercy ? Or, rather, should not the astonishment and admiration with which we are inspired when viewing it, be redoubled, while reflecting on our own unworthiness, and the infinite majesty of Him who came to our relief ? This is a manifestation of love which infinitely surpasses all that we can merit : a love which exceeds all that we could either hope for, or conceive : a love,

Reflections on the nativity of Christ.

at the contemplation of which, we can only admire, adore, and be silent.

But if our admiration be great, should not our hope be equally so ? In the Saviour incarnated, we see the glorious sign of the new covenant which God has made with man. In this we see how faithful God is to his promises, seeing he has given his Son for the life of the world. And, should we not expect that whatever God has promised in his name shall be accomplished with the same fidelity ? Jesus Christ would never have honoured our nature so far as to have united it so intimately to himself, had he not designed to pardon our iniquities, heal our infirmities, wash out our stains, and restore the nature of man to its original purity and innocence. What confidence should we therefore have in the love of our heavenly Father ! He has already given us proofs of an inconceivable love : and will he not with Christ freely give us all things ? What can he refuse to grant to our earnest prayers, who has already given us his most precious gifts without our having even requested them ? And, may we not have the greatest confidence in him, who became man for our sakes ? If God be in Christ, he will certainly accomplish all that he designed by coming into the world. He will put all our enemies under his feet ; he will blot out all our iniquities, and his almighty hand will open the gates of heaven for our reception. If we consecrate our souls to him, he will snatch us from that abyss of vice in which we have been immersed ; and give us power to overcome the world and sin : we shall be made new creatures, holy and glorious like himself.

Can any thing be more just and rational, than our giving up ourselves, on this solemn day, to sentiments of gratitude and joy ? Can love be repaid but by love ? It is true, that the love of God, our Saviour, towards us, is inestimable, and that our's must ever be infinitely less than his : but, let us exert all the powers he has given, and love him with all that fervour with which his grace is ready to inspire us. This sincere love, though weak, will be pleasing in his sight. The love of Christ will induce us to seek, in him, our happiness and joy ; and the contemplation of his mercy will be our most delightful employ. We shall seek nothing with so much fervour as to keep up a holy communion with him by faith. Full of zeal for his glory, we shall avoid and abhor every thing which might defile our souls, or render them displeasing to the Divine Redeemer. Let us dedicate our lives to him, and only expect a continuance of his favour while walking according to his holy precepts. Yes, blessed Redeemer, to thee alone should we consecrate our bodies and souls : to thee we should sacrifice every wish ! At thy manger we should learn to renounce ourselves, to abhor pride, and to suffer (if necessary for our neighbour's good) inconvenience, humiliation, and distress.

Such are the sentiments with which those who are called Christians ought to celebrate the nativity of Christ. Every joyous emo-

 Reflections on the nativity of Christ.

tion should have its origin in the deepest conviction of the great truths of our religion. Let not our admiration be the fruit of ignorance, but of an enlightened conviction. To this end, let us deeply and seriously reflect on the wonders of divine grace; if not to fathom their depths, yet to get a deeper knowledge of their nature and certainty. And, if the greatness of the wisdom of God, and his immense love, astonish and confound us, let them also excite in our hearts a profound veneration for him who dwells in the heavens, and a humble opinion of our own weakness. Let us take heed that our hope be not the effect of a blind persuasion. If it be the offspring of unfeigned faith, what sweet consolation, what celestial joy will it diffuse through our hearts! Then, assisted by faith's victorious power, we shall surmount all the difficulties of life: nothing shall be able to rob us of our joy: nothing be able to destroy our felicity. Lastly, let not our love for Christ be ever separated from the most lively gratitude; let us endeavour, incessantly endeavour, to offer the sacrifice of a pure heart and holy life to him who has done so much for us. "What can we render thee, O our great Benefactor, for so much love! Thou hast united us to God: thou hast purchased salvation and life! Lord, accept the homage of all we have, and all we are! Receive the sacrifice of our bodies and spirits, which both belong to thee!"

 DECEMBER XXVI.

THE PLACE OF CHRIST'S NATIVITY.

AT first sight it seems of little consequence to know the place of Christ's nativity; for we should consider him as our Redeemer, whatever the circumstances might be which attended his mortal life. But, seeing it has pleased God to announce, beforehand, the place where the Saviour of the world should be born; it became necessary that it should happen precisely in that place; and that this should be one of the characteristics whereby Jesus Christ should be known to be the true Messiah.

It is also a matter of small importance to us where we may live; provided we find genuine happiness. There is no place on earth, however poor and despicable, but may have better, and more happy inhabitants, than many of those are who dwell in the largest and most celebrated cities. Do we know a single place on the whole globe, where the works of God do not appear under a thousand different forms: and where a person may not feel that blessed satisfaction which arises from a holy and Christian life? For an individual, that place is preferable to all others, where he can *get* and *do* most good. For a number of people, that place is best where they can find the greatest number of wise and pious men. Every nation declines in proportion as virtue and religion lose their influence on

Place of Christ's nativity.

the minds of the inhabitants. The place where a young man first beheld the dawn and the beauty of renewed nature, and with most lively sensations of joy and gratitude adored his God with all the veneration and love his heart was capable of; the place where a virtuous couple first met and got acquainted; or where two friends gave each other the noblest proofs of their most tender affection; the village where one may have himself given or seen the most remarkable example of goodness, uprightness, or patience; such places, I say, must be dear to their hearts.

Bethlehem, according to this rule, was, notwithstanding its smallness, a most venerable place; seeing there, so many pious people had their abode; and that acts of peculiar piety had often been performed in it. First, the patriarch *Jacob* stopped sometime in it, to erect a monument to his well-beloved *Rachel*. It was at *Bethlehem* that honest *Naomi*, and her modest daughter-in-law *Ruth*, gave such proofs of their faith and holiness: and in it *Boaz*, the generous benefactor, had his abode and his possessions. At *Bethlehem* the humble *Jesse* sojourned, the happy father of so many sons; the youngest of whom rose from the pastoral life to the throne of *Israel*. It was in this country that *David* formed the resolution of building a house for the Lord: and in which he showed himself the true shepherd and father of his subjects, when at the sight of the destroying angel, whose sword spread consternation and death on all hands, he made intercession for his people. It was in *Bethlehem* that *Zerubabel* the prince was born; this descendant of *David*, who was the type of that Ruler and Shepherd under whose empire *Israel* is one day to assemble, in order to enjoy uninterrupted happiness. Lastly, in this city the *Son of God* appeared; who, by his birth, laid the foundation of that salvation, which, as Redeemer, he was to purchase by his death for the whole world. Thus, in places which from their smallness are entitled to little notice, men sometimes spring, who become the benefactors of the human race. Often, an inconsiderable village has given birth to a man, who, by his wisdom, uprightness, or heroism, has been a blessing to whole kingdoms.

It is our business so to live in our cities or villages, that the end for which *Jesus Christ* was born may be accomplished in us. It is certain, that genuine piety would make the most rapid progress in the earth, if every where men endeavoured to give proofs of innocent manners, and fervent faith; and become models of patience, diligence, and uprightness. If our cities furnished a greater number of virtuous examples, their influence would soon become extended to the inhabitants of the country: and in the smallest villages or hamlets we should see persons who, like *Joseph* and *Mary*, were distinguished by their piety; and would attract the respect of the wise and good, though living in the depth of poverty and abasement. God would shed his blessings over the country of these good people; and in some generations might we not hope to see a people formed, full of the fear of the Lord, and diligently walking in his ways.

 Place of Christ's nativity.

He who has travelled most over the world, who has visited cities, the dwelling places of kings ; and who has been a witness of the various crimes committed there ; has he not cause to be thankful to God, if at last he find a town or village, where, in a peaceful cot, encompassed with quiet neighbours, he may consecrate himself entirely to the service of God and the good of man, and thus arrive at that genuine happiness which flows from peace and serenity of soul ? He will not then regret that he lives not in places, more magnificent indeed, but where sensual pleasure spreads all its snares : more superb, but where vice has its throne : more rich, but where the inhabitants live in forgetfulness of God, and the duties they ought to perform. To these he will prefer an obscure retreat ; where, sheltered from cutting remorse, he may spend his days in tranquillity and joy.

 DECEMBER XXVII.

THE CARE WHICH GOD TAKES OF MEN FROM THEIR BIRTH.

WHAT a multitude of wants have we the moment we are born ! It is with great agony, and through the assistance of others, that we are brought into the world ; and we should have speedily lost the life we began to live, had not a variety of things, relative to our clothing and nourishment, been provided beforehand ; and had we not found persons who condescended to take care of us in that state of weakness, in which we were totally destitute of all things : or rather, if our heavenly Father had not watched over our preservation. He took care of us when we were in our mother's womb ; where no human wisdom or diligence could have provided for us. His hands formed, arranged, and connected all the members of our bodies. He pointed out the veins the course they should run : and filled them with the vital fluid. *He has clothed us with skin and flesh, and fenced us with bones and sinews.* Job x. 2. We were a shapeless mass ; but the Almighty fashioned us ; and uniting a rational and intelligent spirit with our bodies, he made a human creature worthy of himself, for he stamped it with his own image. The same kind Providence which presided over our formation, has never forgotten us : but continued to watch over us with paternal care. At our entrance into the world, we were provided with tender and faithful friends, who received us with extraordinary affection, and who spared neither trouble nor expense to do us good : these faithful friends were our parents. What miserable creatures must we have been, had not our heavenly Father inspired them with such disinterested love for us ! But, could even this love have availed, had these parents been destitute of the means to assist us ! The more they loved us, the more insupportable their indigence would have been : and the more miserable they must have felt, while destitute of the power to supply our wants. But God took care that they should have every thing that was necessary for us, precisely at the time in which it was needed.

The care which God takes of men from their birth.

But the tender care of the Lord extended far beyond the moment of our birth. He then laid the foundation of our future happiness. Poor and despicable creatures, we neither knew, nor could know, at that time, what our lot should be. But all was perfectly known to him. He saw the whole of our life, with the future and contingent events which concerned it; together with all their consequences and references. He knew what would be most advantageous to us, regulated our lot accordingly, and determined, at the same time, on the means which he purposed to employ in order to procure us that felicity which his mercy designed. From our birth the causes existed, which were to influence our future happiness; and began then to act conformably to the divine views. How much did the happiness of our lives depend on our parents: their manner of thinking, their circumstances in life, their connexions, &c. ! How much did the education we received, the examples we had before us, the connexions we formed, the opportunities we had of exercising our powers, and unfolding our talents, influence the happiness of our whole life!

And did not the wisdom and goodness of God our Father appoint, regulate, and conduct every advantageous circumstance? We could not choose our own parents, nor appoint their situation in life. The choice of the master's and friends we had in our youth, did not depend wholly on our parents; and whatever their prudence and attention might have been, they themselves were dependent on circumstances and opportunities. It was God who managed all those conjunctures which have proved so advantageous to us. It was he who watched over our happiness; and who, in his great goodness, directed and controlled all events which might prove favourable or unfavourable to our wellbeing. He foresaw and determined every thing; and all his dispensations towards us were acts of wisdom and mercy. He knew what adversities would be useful to us; and appointed what their sources should be; when they should begin, when they should end, and the advantages we should derive from them. All these causes acted for some time in secret: by degrees they were developed: and in many instances we have already seen how necessary our losses and afflictions were to our welfare. But they could not have had these salutary effects without the concurrence of many causes which acted remotely a long time before, and were utterly unknown to us. In a word, the Divine goodness has wisely directed all the events of our life, so as to be most beneficial to us.

These reflections should fill our souls with confidence and tranquillity. What can be more consolatory, than to be persuaded that an invisible Being takes care of us: a Being who is infinitely good, wise, and powerful: who has watched over us from the moment of our birth; and who, from that hour, determined and regulated every thing necessary for us during the course of our lives: who has counted our days, and fixed the term of our life, so that no human power can change it: and who, from the first moment of our existence, has provided every thing necessary for our present and eter-

The care which God takes of men from their birth.

nal happiness ? The confidence and peace which rest on this basis must be immoveable.

DECEMBER XXVIII.

THE TERM OF HUMAN LIFE.

EVERY man dies precisely at the time that God has appointed in his eternal wisdom. As the time of our birth is fixed, so also is the time of our death. But the term of our life is not subject to fatality : nor inevitable necessity : such things have no existence. All that occurs, may happen sooner or later, or not take place at all. And it is always possible, that the man who died to-day might have died sooner, or might have lived a much longer time. God has not fixed man's days by an arbitrary, or absolute decree, without taking in the circumstances in which he might be found. He is an infinitely wise Being, who never acts but from motives worthy of himself. He therefore must have just reason to induce him to determine, that such a man should leave the world at such a time, rather than at another. But, although the term of life be in itself neither influenced by necessity, nor fatality, it is nevertheless certain, and can never be really changed.

When man dies, there are always some causes which infallibly lead to his death :—but these may be always suspended, or changed by the Supreme Being. One dies of a mortal disease : another by a sudden and unforeseen accident. One perishes by fire : another by water. God has foreseen all these causes ; nor is he an idle and indifferent spectator in the business ; he has examined them all with care ; he has compared them with his own purposes : and sees whether he can approve them or not. If approved, they are consequently determined ; and, in that case, there exists a divine decree, in virtue of which the man dies of such and such an accident, and in such a particular time. This decree can neither be revoked nor prevented : for, the same reasons which God has at present for removing a man from this world, were known to him from all eternity : and he formed the same judgment then of it which he has now. What, therefore, should induce him to alter his purpose ?

But, it may so happen, that God, foreseeing the causes of the death of a particular person, did not approve of them. In this case, he must, at least, have determined to permit them, without which they could not take place, nor could the man die. But, if the permission of those causes of death were resolved on, God wills therefore that we should die in the time in which those causes shall exist. It is possible, that he might have been inclined to grant us longer life ; and did not approve the cause of our death : but it was not consistent with his wisdom to counteract the operation of those causes. He views the universe collectively, and finds reasons to induce

The term of human life.

him to permit the death of a certain person at a particular time ; although he approve not the causes, manner, and circumstances of that death. His wisdom finds means to direct that death to the most useful purposes ; or, he foresaw that a longer life, in that person's circumstances, would neither be useful to himself, nor to the world : or, lastly, he saw, that in order to prevent that death, there must be a new and different combination of things ; a combination which could not accord with the general plan of the universe, and which would have prevented a greater good from taking place. In a word, although God may sometimes disapprove the causes of a man's death, he has, nevertheless, wise and just reasons to permit them to take place ; and consequently to purpose that the man shall die at that time, and by those means.

These considerations are calculated to make us look on death with Christian fortitude. What renders death formidable is, chiefly, the uncertainty of the manner and time of our leaving the world. If we knew beforehand, when, and what manner of death we should die, we should probably wait for it with more courage, and fear it less in its approaches. Now, nothing can be more efficacious to calm and strengthen our mind than the persuasion, that Divine Providence watches over our lives : and that from the foundation of the world he has determined, with infinite wisdom and goodness, the time, manner, and circumstances of our death. The term of our lives is therefore appointed ; and no man can die sooner or later than God has determined, for the good even of the person himself ; for each person dies precisely at the time in which it is most to his own advantage. An Almighty Providence watches over our days : it lengthens or shortens them as it judges will be most profitable to the children of God ; not only in reference to this world, but also in reference to eternity. Fully persuaded of this consolatory truth, we may wait for death with a tranquil mind ; and seeing the hour is uncertain, let us be found constantly ready to meet it. It certainly will not appear till God judges it most expedient. It is true, we know not what kind of death we shall die, nor the circumstances of it ; but, it is sufficient to know, that we cannot die but in that way in which the beneficent Governor of the world sees it will be best for ourselves, and for all those who appertain to us. Fortified by this thought, let us proceed without anxiety on our earthly pilgrimage ; let us cheerfully submit to all the dispensations of Providence, and never fear any danger to which the performance of our duty may expose us.

DECEMBER XXIX.

THE INSTABILITY OF EARTHLY THINGS.

THERE is nothing in nature whose state and mode of being is not liable to change. Every thing is the sport of frailty and inconstancy.

The instability of earthly things.

cy : and nothing is so durable as to continue always like itself. The most solid bodies are not so impenetrable, nor their parts so closely connected, as to be exempt from dissolution and destruction. Every particle of matter changes its form insensibly. How many changes have our bodies undergone since they were formed in our mother's womb ! We annually lose something of what we formerly were ; and gain as many new particles from the animal, vegetable, or mineral kingdom. Every thing on earth increases and decreases by turns ; but with this difference, that these changes do not operate so speedily in some bodies as in others.

The celestial bodies appear now the same that they were from the beginning ; and these are probably the most invariable of all bodies. Nevertheless, accurate observers have noticed, that certain stars have disappeared, and the variableness of the spots on the sun's face prove, that even that luminary is, in some respects, subject to the general law of mutability. Besides, his motion renders him subject to several variations ; and although he is never extinct, yet he has been often obscured by fogs, clouds, and perhaps by internal revolutions also. This is all that we can know, in the almost immeasurable distance we are from him. How many other changes, both external, and internal, might present themselves to our eyes, were we near enough to that luminary, we cannot tell. If the instability of terrestrial things strike us more, this is because we are so nigh them. And how frail are they ! And how subject to change ! The object continues to resemble itself ; and, nevertheless, it is different from what it once was. We daily see the things here below under new forms ; some increase, others diminish and perish.

The year, which will come to its close in about two days, has furnished us with incontestable proofs of this. Even in the little circle in which we are confined, how many revolutions have taken place ! Many of those whom we have known for many years, are no more. Many whom we have known to be rich, are now become poor : or, at least, reduced to straitened circumstances. And, if we examine *ourselves*, shall we not find, that in many respects, *we* also have been changed. Have not our health and activity suffered considerable decrease ? And do not all these alterations indicate, that the great and last revolution which death shall work in us is at hand ? Besides, how many things may happen in this and the two following days of this year ! We may become poorer than we are ; be attacked by sickness ; experience the unfaithfulness of reputed friends ; or even die in this short space of time : at least it is certain, that circumstances may occur which it was absolutely impossible for us to foresee.

Reflections of this nature might well distress us, or even drive us to despair, if we could not derive support and consolation from religion : but this leads us to the only, invariable, and eternal Being, whose very nature is unchangeable. This immutable Being must be, to eternity, just what he is. Therefore his mercy endures for ever ; and his righteousness from generation to generation. May this truth

The instability of earthly things.

be ever present with us, that it may soften the disagreeable vicissitudes which we continually meet with here below ! How happy will it be for us, if all these revolutions which days, years, and times bring with them, lead us nearer to the Supreme Good ; and to the state of everlasting glory and felicity ! “ Thus, full of confidence in his invariable goodness, we will submit, with resignation, to all the changes and chances of this mortal life ; all our souls shall rejoice in him, who is the immutable Being, our Light, our Rock, and our sure Defence.”

DECEMBER XXX.

HOW TIME IS GENERALLY EMPLOYED.

THE approaching close of the year should lead us to make some reflections, which, however important, do not always occupy us as they ought. In order to tell more sensibly how short the course of our life is, let us now examine how we have spent the days that are past ; though we have much reason to believe this will be to us a subject of humiliation and confusion.

Let us first consider those days, to regulate the use of which, was utterly out of our power. How many hours of this year have we employed in eating, drinking, and sleeping ; in a word, in caring for the body, and providing for its various necessities ! How many hours more have been spent in almost useless occupations, or at least such as were of no use to our immortal souls ! For instance, in unnecessary journeys, in disagreeable company, and in long and fatiguing meals ! How many hours have we spent in uncertainty, and consequently in inaction ? How much time have we lost in examining intricate questions, and embarrassed affairs, weighing the *pros* and *cons*, before we resolved to act in certain important matters ? And how many hours have we lost in the expectation of particular advantages ? Thus, in taking but even a superficial view of the use we have made of this year, we find that a multitude of days have been lost to that immortal spirit which inhabits this clay tenement : and after the deduction, how little remains of the year which we can say has been employed for real life ? It is evident that out of 365 days, there are scarcely 50 of which we can say, “ These are ours : we have employed them in the great interests of our souls, and in the acquisition of eternal felicity.” And, of this small remaining number of days, how many hours have we lost by our folly or frailty ! Alas ! how much time has been sacrificed to vice, or tainted by sin ! God of mercy ! how humiliating is this thought ! How proper to confound us ! On this subject, nothing but the ever salutary doctrine of the merit of thy Son can calm our terror, or snatch us from eternal misery !

How many of those hours which the paternal love of God gave us to be employed in our eternal interests, have been foolishly la-

How time is generally employed.

vished away, and that with the blackest ingratitude! Precious hours! during which, alas, we have wandered far from this most compassionate and best of parents! Can we not reckon many hours which we have sacrificed to the world, to vanity, to indolence, to false pleasures; which we have profaned by impurity, envy, jealousy, backbiting, and other vices, which betray a heart destitute of proper love and respect to God; and of charity to our neighbour? And have we never spent any of that time which we should have employed in advancing the kingdom of Christ, in opposition to the divine counsels, in disturbing the peace of society, and distracting his church?—And, even since God has brought us to a better mind, and inspired us with a desire to walk in his ways; how many days have we irrecoverably lost, which should have been employed in that religion which was our glory, and which pointed out the path that led to eternal happiness! How have we been injured by distractions, coldness, barrenness of soul, doubts, inquietudes, want of temper, and impurity of mind! These, and many other infirmities, the consequences of improper conduct, the frailty of the body, the weakness of the mind, or the strength of old habits, have often disgraced those who have made some considerable progress in the ways of God. Now, by all these things, our piety is injured, the progress of our happiness retarded, and our graces either weakened or destroyed! Lastly, with what speed does the little portion of time which we can dispose of, fly away! A year is gone, and we have scarcely perceived it! And what importance is a *year* to a being whose real life may be reckoned by *hours*! We have scarcely thought seriously of it, till another year is slipped by. Had we employed this year in the work of our salvation, we should not desire to recall it either in whole or in part. But, now that we find so little of it has been spent in the great purposes for which it was given, we wish to recall that part at least of which we have made the worst use: but it is in vain: the year closes—and all the good and bad actions which have marked it, are swallowed up in eternity!

Father of mercies, reconcile us to thyself by Christ Jesus: and grant that this mispent year may not become a subject of anguish to us on our death-bed, nor the cause of our perdition through eternity! Pardon, O pardon all sins which we have this year unhappily committed against thee! And grant us *mercy*!—*mercy*, at the hour of death; *mercy*, in the day of judgment; and *mercy* through all eternity!

DECEMBER XXXI.

A HYMN OF THANKSGIVING AT THE CLOSE OF THE YEAR.

LORD! thou art the God of *time*: thou art also God of *eternity*! I will sing a joyous hymn to thy praise: I will celebrate thy holy name. A year is finishing its course.—To what do I owe the conti-

A hymn of thanksgiving.

nuation of my existence?—It is to thy grace alone, and to thy paternal bounty.

Being of beings! receive my adoration! Everlasting Lord, thou canst not vary; but as for us, poor and feeble mortals, we have been, are now, and shall be *dust*. Thou alone art incapable of change. Thou hast been, thou art, and thou shalt be to eternity!

Lord, thy faithfulness endures from generation to generation: thy mercy is new every morning:—there is not a moment of my life in which thou hast not given me some new blessing.

Thou hast led me by thy fatherly care through the year which is now ending. When my heart became a prey to anxiety and distress, thou didst pour out thy consolations, and didst haste to my succour. I will praise thee! I will exalt thee, from the ground of my heart; I will cast myself anew on thy unerring guidance and merciful support!

Pardon, O my God! Pardon the innumerable offences which I have committed against thee in the days that are past! And let me once more, for the sake of Jesus, experience thy paternal support! Teach me to do thy will: teach me to please thee as long as I live!

Inspire me with new zeal, and grant me new strength to walk before thee in the paths of righteousness! Make me attentive to thy voice in my conscience! Quicken and sanctify my heart by thy Spirit; that being filled with love, and detached from the world, it may ever be united unto thee, O thou Sovereign Good!

The world and its enjoyments flee away: in it, therefore, I should see no happiness.—Even here below, I may aspire after pure joys.—I am related to angels:—my patrimony is heaven:—grant, O God, that I may incessantly aspire after it!

O my God, teach me to redeem the time, and to walk with holy circumspection in the way which leads to eternity! Condescend to alleviate the burthen of life, till I reach that happy period in which I shall rest from my labours, and my repose be interrupted no more! Amen.

FINIS.

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 and there foreclosed.—Dated December 26, 1861.
 at ten o'clock A. M., and said mortgage will be then
 in the city of Syracuse, on the 25th day of March, 1862,
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 fore, by virtue of the power of sale in said mortgage,
 and agreed to be the same.

